Draft Environmental Assessment

HABITAT CONSERVATION PLAN
KAUA'I LAGOONS RESORT

PREPARED BY:
U. S. FISH AND WILDLIFE SERVICE

JULY 11, 2011

COVER SHEET

Title for Proposed Action: Issuance of an Endangered Species Act Section 10(a)(1)(B) permit for the incidental take of federally-listed threatened and endangered species during construction and operation of Kauaʻi Lagoons Resort, Kalapakī Ahupuaʻa, Līhuʻe District, Island of Kauaʻi, Hawaiʻi.

Unit of the U.S. Fish and Wildlife Service Proposing the Action: Regional Director, Region 1, U.S. Fish and Wildlife Service, Portland, Oregon.

Legal Mandate for Proposed Action: Endangered Species Act of 1973, as amended, Section 10(a)(1)(B), as implemented by 50 CFR 17.22.

Applicant: Kauaʻi Lagoons LLC

Permit Number: N/A

Duration: 30 years

U.S. Fish and Wildlife Service Contact: Megan Laut, and Michelle Bogardus, Pacific Islands Fish and Wildlife Office, U.S. Fish and Wildlife Service, 300 Ala Moana Boulevard, Room 3-122, Honolulu, HI.

SUMMARY

Private landowners, corporations, state or local governments, or other non-Federal landowners who wish to conduct activities that might incidentally "take" fish or wildlife species that are listed as endangered or threatened must first obtain an Incidental Take Permit (ITP)(Permit) under Section 10(a)(1)(B) of the Endangered Species Act of 1973, as amended (16 U.S.C. § 1531 *et seq*.), (ESA) from the U.S. Fish and Wildlife Service (USFWS).

In accordance with section 10(a)(1)(B) of the ESA, Kauaʻi Lagoons LLC(KL), the owner and operator of the Kauaʻi Lagoons Resort, has prepared a Habitat Conservation Plan (HCP) to comply with incidental take permit (ITP) requirements of the USFWS. An incidental take license (ITL) must also be obtained from the State Department of Land and Natural Resources (DLNR) in accordance with Chapter 195D of the Hawaiʻi Revised Statutes. Upon issuance of the ITP and ITL, KL will be authorized to incidentally take, in connection with the construction of new resort facilities and operation of the resort, the threatened and endangered species covered by the HCP.

The USFWS has prepared this draft Environmental Assessment (EA) pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended (42 U.S.C. 4321-4347). The decision to issue an ITP is a Federal action subject to compliance with the NEPA. As part of the NEPA process, an Environmental Assessment (EA) or an Environmental Impact Statement (EIS) is required to evaluate the potential environmental impacts of, and potential alternatives to, issuing an ITP and approving the implementation of the proposed HCP. This Draft EA describes the existing environment on the Island of Kauaʻi; discusses alternatives to the Proposed Action (including the No Action Alternative); and evaluates the impacts of the alternatives.

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1.1 PURPOSE AND NEED FOR ACTION

1.1.1 BACKGROUND

Kaua'i Lagoons Resort, established in the 1980s is an ocean front property that encompasses approximately 600 acres. The resort was originally developed with two 18-hole golf courses, a golf and racquet club facility, a network of man-made navigable lagoons, a restaurant, commercial development, and associated parking areas. Kaua'i Lagoons LLC (KL) is currently undertaking additional development within the resort and golf complex. This development consists of several projects comprising a total of 772 resort-residential units (consisting of 707 condominium/time share and multi-family units and 65 single-family residential lots). Support facilities that will complete the resort expansion include a new golf clubhouse, a 27-hole golf course complex reconfigured out of the two original courses, central operations building with a marketplace/café and administrative office facilities, commercial area, marketplace express-grill kitchen, fitness center, restaurant, public recreational facilities, sales facility, engineering/maintenance building and parking. Some of this development will replace structures and facilities damaged by Hurricane 'Iniki in September 1992, and some will replace portions of the original two golf courses.

Despite their artificial nature, the lagoons, golf courses, and water features at the resort have been colonized by several bird species listed as threatened or endangered under the Federal Endangered Species Act (ESA). These include the Hawaiian Goose or *Nēnē* (*Branta sandvicensis*, hereafter referred to as Nēnē) (endangered), the Hawaiian endemic sub-species of the Black-necked Stilt (*Himantopus mexicanus knudensi*, hereafter referred to as Hawaiian Stilt) (endangered), the Hawaiian Coot (*Fulica alai*) (endangered), the Hawaiian endemic sub-species of the Common Moorhen (*Gallinula chloropus sandvicensis*, hereafter referred to as Hawaiian Moorhen) (endangered), and the Hawaiian Duck (*Anas wyvilliana*) (endangered). Currently, the resort supports one of the largest breeding populations of Nēnē in the state, as well as populations of Hawaiian Moorhen and Hawaiian Duck, and large numbers of predominantly non-breeding Hawaiian Coots on a seasonal basis. The property also supports a small breeding population of Hawaiian Stilts. Seabird species, including the Newell's shearwater (*Puffinus auricularis newelli)* (threatened), the Hawaiian petrel *(Pterodroma sandwichensis)* (endangered), and the band-rumped storm-petrel *(Oceanodroma castro)* (candidate for listing), do not utilize the KL property for breeding or foraging, but are known to fly over the area when transiting between the ocean and mountainous breeding sites. These species fly at night and are attracted to artificially lighted areas which can result in disorientation and subsequent fallout due to exhaustion or collision with man-made structures.

Over the past four years, the State of Hawaii, Department of Land and Natural Resources (DLNR), Division of Forestry and Wildlife (DOFAW) has translocated Nēnē eggs and goslings, as well as paired adults and their goslings, from the resort to other properties on Kaua'i. The motives for these relocation efforts have been twofold: to assist in the recovery of the species by establishing additional populations, and to control the Nēnē population at the resort in order to minimize the potential public safety hazard these birds pose to arriving and departing aircraft at the immediately adjacent Līhu'e International Airport.

1.1.1.1 KL's Need for Agency Action

KL's need for the action is based on the potential that its short-term construction and long-term operations of both existing and new structures and facilities may result in the take of threatened and endangered species that is illegal without an Incidental Take Permit (ITP). The ITP would cover the full geographic extent of the resort and golf course facilities (see Figure 1.1 and Figure 1.2).

Section 9 of the ESA prohibits the unauthorized "take" of any endangered or threatened species of fish or wildlife listed under the ESA (see Section 1.2.2). The USFWS may permit, under certain

terms and conditions, any taking otherwise prohibited by Section 9 of the ESA if such taking is incidental to the carrying out of an otherwise lawful activity. After KL was advised and determined that existing and proposed development and operational activities had the potential to affect these listed species, KL submitted an application to the USFWS for an ITP under Section 10(a)(1)(B) of the ESA, as amended.

Figure 1.1 Satellite Photo of Island of Kaua'i.

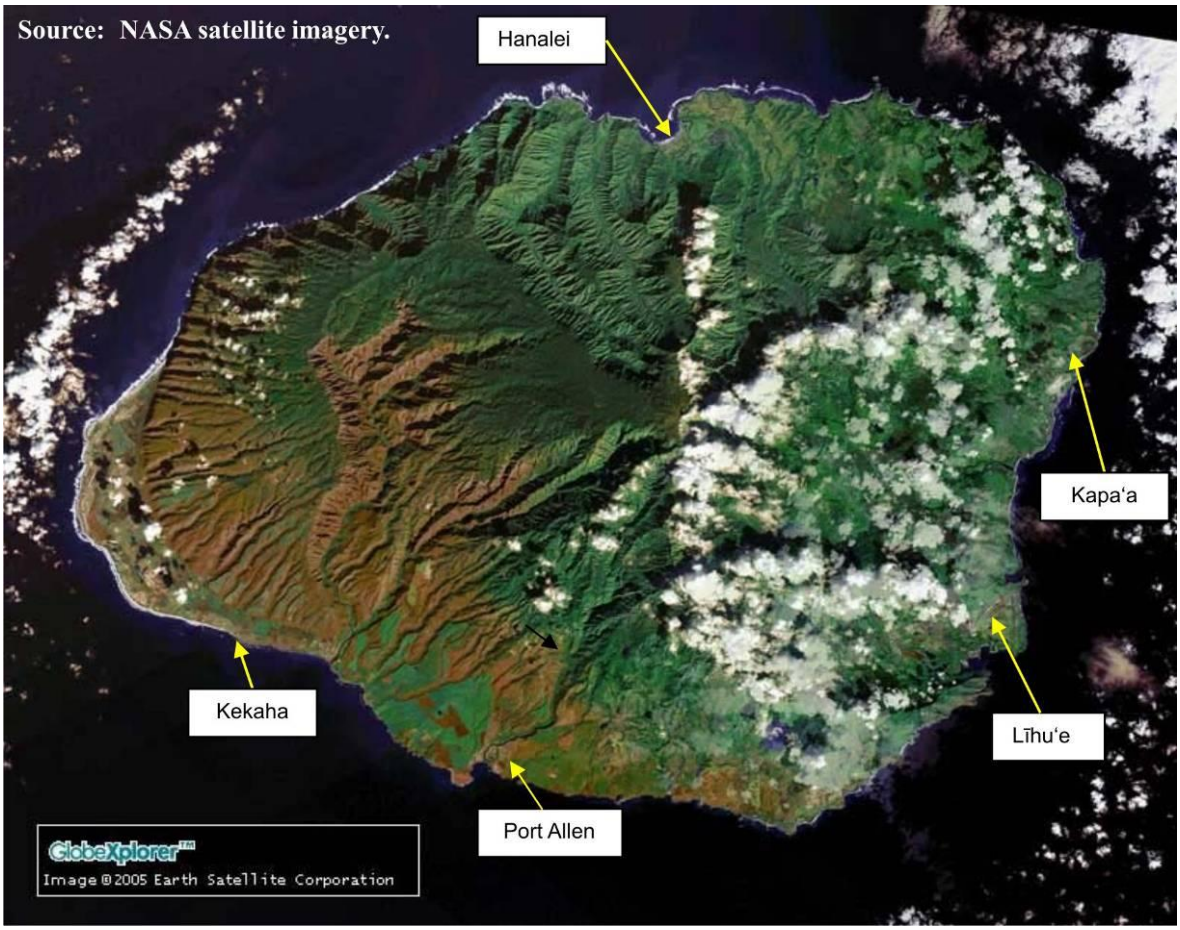
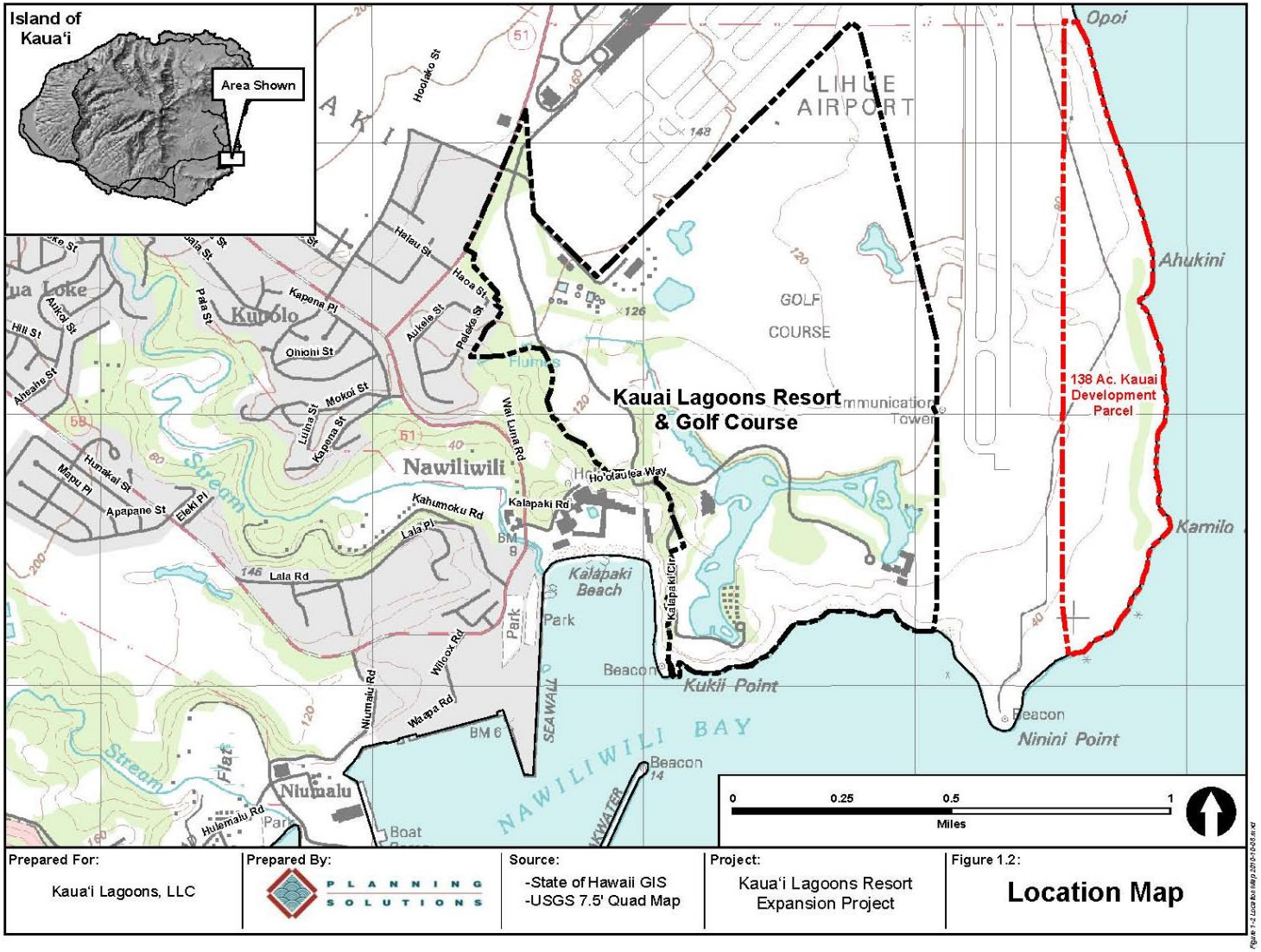


Figure 1.2 Location Map



Given the presence of endangered species and the potential for either construction or ongoing resort operations to affect them, KL has prepared a Habitat Conservation Plan (HCP). The HCP supports its application to the USFWS for an ITP under the ESA and to the BLNR for an Incidental Take License (ITL) under Chapter 195D of the Hawai'i Revised Statutes.

USFWS began coordinating with KL concerning endangered species issues at the resort in the fall of 2007. At that time specific impact avoidance efforts were identified, which KL then implemented during the 2007-2008 Nēnē nesting season. These measures included erecting wooden exclusion fencing around two construction sites, improving nesting habitat away from construction areas, providing endangered species awareness training to all personnel that work on the property, as well as Nēnē monitoring efforts.

In mid-2008, USFWS, DOFAW, and KL met to review the results of the 2007-2008 nesting season, and to develop an enhanced suite of impact avoidance measures for the following season. These measures included increasing the endangered species awareness training program, employing construction and biological monitors, imposing a speed limit and posting warning signs throughout the property, enhancing nest areas, conducting predator trapping, establishing centralized contractor parking areas and employee shuttles, and providing secure trash and recycling containers at construction sites. KL implemented all of these measures, which were formalized in a Memorandum of Agreement (MOA) between the USFWS and KL, and in a Biological Opinion issued by the USFWS, in January of 2009.

In October 2008, KL convened a meeting of the USFWS, DOFAW, and key officials associated with the Līhu'e International Airport (i.e., Hawai'i Department of Transportation, Airports Division, which operates the Airport [HDOT]; Federal Aviation Administration [FAA]; U.S. Department of Agriculture, Wildlife Services [USDA-WS]). The purpose of this meeting was to discuss long-standing and continuing concerns about potential hazards to aircraft safety posed by the large Nēnē population present at the resort[1]. The airport is located immediately adjacent to the resort.

Throughout the last quarter of 2008 and the first half of 2009, dialogue with the Applicant continued regarding all of these endangered species issues at the resort, and how they should be addressed both in the short-term and also in the longer term through an HCP.

In October 2009, KL, USFWS, DOFAW, HDOT, FAA, and USDA-WS met to discuss airport efforts to address bird hazards at Līhu'e International Airport and to coordinate KL's HCP efforts with the separate efforts of the airport agencies pursuant to FAA regulations. In January 2010, KL submitted to the USFWS and DOFAW a Draft HCP in support of incidental take authorization. Some changes were requested by the State Endangered Species Recovery Committee, USFWS, and DOFAW; KL subsequently submitted a new draft that incorporated these comments. KL submitted a further revised draft HCP in October 2010 which reflected additional changes. The HCP application covers the following eight (8) bird species (henceforth "Covered Species"), all of which are listed as a candidate, threatened, or endangered species under the ESA and/or Chapter 195D:

- Hawaiian Goose, or Nēnē (*Branta sandvicensis*) (endangered)
- Hawaiian Stilt (*Himantopus mexicanus knudensi*) (endangered)
- Hawaiian Coot (*Fulica alai*) (endangered)
- Hawaiian Moorhen (*Gallinula chloropus sandvicensis*) (endangered)

[1] See, e.g., Wildlife Hazard Assessment, Līhu'e Airport LIH (2005) (prepared for Hawaii Department of Transportation (HDOT), Airports Division, by U.S. Department of Agriculture – Wildlife Services); Hawaiian Goose (Nēnē) Wildlife Hazard Assessment, Lihue Airport LIH (July 22, 2009) (USDA-WS) (number of Nēnē dispersed at LIH has been steadily increasing since 2004; in 2008 USDA-WS observed 2,791 individual Nēnē at LIH, including 230 runway crossings involving 972 individual Nēnē).

- Hawaiian Duck (*Anas wyvilliana*) (endangered)
- Hawaiian Petrel (*Pterodroma sandwichensis*) (endangered)
- Newell's Shearwater (*Puffinus auricularis newelli*) (threatened)
- Band-rumped Storm-Petrel (*Oceanodroma castro*)[2] (candidate for listing; this species is being covered at the request of the applicant due to the possibility that the species may be listed within the requested permit term (30 years))

Harm to these species is prohibited under both Federal and state laws unless permits are obtained. Consequently, KL is applying for an ITP from the USFWS under Section 10(a)(1)(B) of the ESA. If granted, an ITP would authorize the incidental take of the federally listed species identified above for up to 30 years from the time of issuance. KL is also seeking an ITL in accordance with Chapter 195D, Hawai'i Revised Statutes to authorize potential impacts to these same Covered Species. The ITL is issued by DLNR. The relatively long term coverage (up to 30 years) that is being sought stems from the expectation that KL will continue to be an attractive foraging and breeding ground for endangered native birds. A more detailed description of the activities and facilities proposed to be covered by the HCP and associated permits are provided in Section 2.2.

Pursuant to Section 10(a)(2)(A) of the ESA, an applicant for an ITP must develop, fund, and implement a USFWS-approved HCP. The HCP supports the issuance of both the Federal ITP and State ITL, and describes how the Applicant will avoid, minimize, mitigate, monitor, and implement adaptive management provisions for the incidental take of the Covered Species that may occur during construction and operation of a proposed project. Because the decision to issue an ITP is a federal action, it is subject to compliance with the National Environmental Policy Act (NEPA). The HCP, which this Environmental Assessment supports, covers both short-term construction and long-term resort and golf course operations; it seeks a 30-year ITP and ITL for Kaua'i Lagoons.

1.1.1.2 Purpose and Need for the USFWS' Proposed Action

For the USFWS, the purpose of the Proposed Action (i.e., issuance of the requested ITP) includes the following:

- Responding to KL's application for an ITP for the Covered Species related to activities that have the potential to result in take, pursuant to the ESA Section 10(a)(1)(B) and its implementing regulations and policies;
- Protecting, conserving, and enhancing the Covered Species and their habitat for the continuing benefit of the people of the United States (per Section 2(a)(4) of the ESA); and
- Ensuring species needs are met through minimizing and mitigating to the maximum extent practicable.

For the USFWS, the need for the Proposed Action includes the following:

- Provide a means and take steps to conserve the ecosystems depended on by the Covered Species;
- Ensure the long-term survival of the Covered Species through protection and management of the species and their habitat; and
- Ensure compliance with the ESA, NEPA, and other applicable federal laws and regulations.

The proposed issuance of an ITP by the USFWS is a federal action that may affect the human environment and therefore is subject to review under NEPA. USFWS has prepared this EA to evaluate the impacts that KL's proposed action and identified alternatives would have on the natural

[2] The first seven species listed above are listed as either threatened or endangered under the ESA, and thus are automatically protected under Chapter 195D. The Band-rumped Storm-Petrel is not presently listed under the ESA, but instead is a Candidate for listing; nevertheless, the State of Hawai'i has independently listed this species as endangered under Chapter 195D.

and human environment. The scope of the analysis in this EA covers the direct, indirect, and cumulative environmental impacts of approving the HCP and issuing an ITP, and the anticipated future impacts of implementing the HCP. The following documents will also be included in the record for this proceeding and will supplement the analyses contained in this EA: (1) an ESA Section 7 Biological Opinion regarding issuance of the ITP; (2) ESA Section 10 Statement of Findings; and (3) a NEPA analysis decision document.

1.1.2 PERMIT ISSUANCE CRITERIA

Under provisions of the ESA, the Secretary of the Interior (through the USFWS) may issue a permit for the incidental taking of a listed species if the application conforms to the issuance criteria identified in Section 10(a)(2)(B) of the ESA. In order to issue a permit, the ESA requires:

- The taking will be incidental to an otherwise lawful activity;
- The applicant will, to the maximum extent practicable, minimize and mitigate the impacts of such taking;
- The applicant will ensure that adequate funding for the conservation plan and procedures to deal with unforeseen circumstances will be provided;
- The taking will not appreciably reduce the likelihood of survival and recovery of the species in the wild; and
- That measures required under Section 10(a)(2)(A)(iv), if any, are met and such other assurances that may be required that the HCP will be implemented.

As a condition of receiving an ITP, an applicant must prepare and submit to the USFWS for approval an HCP containing the mandatory elements of Section 10(a)(2)(A). An HCP must specify the following:

- The impact that will likely result from the taking;
- What steps the applicant will take to minimize and mitigate such impacts, the funding available to implement such steps, and the procedures to be used to deal with unforeseen circumstances;
- What alternative actions to such taking the applicant considered, and the reasons why such alternatives are not proposed to be utilized; and
- Such other measures that the Secretary may require as being necessary or appropriate for the purposes of the plan.

The ESA Section 10 assessment will be documented in the respective Section 10 findings document produced by the USFWS at the end of the process. If the USFWS makes the above findings, the USFWS will issue the ITP. In such case, the USFWS will decide whether to issue a permit conditioned on implementation of the proposed HCP as submitted or to issue a permit conditioned on implementation of the proposed HCP as submitted together with other measures specified by the agency. If the USFWS finds that the above criteria are not satisfied, the permit request shall be denied.

1.2 FEDERAL REGULATORY CONTEXT

1.2.1 NEPA AND ENVIRONMENTAL ASSESSMENT PROCESS

NEPA provides an interdisciplinary framework for Federal agencies to analyze and disclose the effects of their proposed actions on the human environment and consider reasonable alternatives in a written statement as either an Environmental Impact Statement (EIS) or an Environmental Assessment (EA). Although the requirements of the ESA and NEPA overlap, the scope of NEPA exceeds the ESA by considering impacts of a Federal action on other natural and human resources

besides endangered and threatened species and their habitats. An Environmental Assessment (EA) should be a concise document that provides sufficient evidence and analysis for determining whether to prepare a more comprehensive Environmental Impact Statement (EIS). With respect to HCPs in general, compliance with NEPA is not a direct obligation or requirement of the applicant for the Section 10 permit. However, the USFWS must comply with NEPA when making their decisions on the application and implementing the Federal action of issuing an ITP. Consequently, the appropriate environmental analyses must be conducted and documented before a Section 10 permit can be issued. The USFWS has determined that an EA is initially appropriate for this action to determine if there will be significant impacts to the environment. If the USFWS determines that the environmental consequences of the proposed action evaluated in this EA are not significant, the USFWS would issue a Finding of No Significant Impact (FONSI). If the USFWS determines that the environmental consequences of the proposed action are significant, preparation of an EIS would be required.

1.2.2 FEDERAL ENDANGERED SPECIES ACT

The ESA provides broad protection for plants, fish, and wildlife that are designated as threatened or endangered in the U.S. or elsewhere. Section 9 of the ESA prohibits the unauthorized "take" of any endangered or threatened species of fish or wildlife listed under the ESA. "Take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect species listed as endangered or threatened, or to attempt to engage in any such conduct (50 CFR 17.3). "Harm" has been defined by the USFWS to mean an act which actually kills or injures wildlife, and may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering (50 CFR 17.3). "Harass" has been defined to mean an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering (50 CFR 17.3). Section 10 of the ESA contains exceptions and exemptions to Section 9, if such taking is incidental to the carrying out of an otherwise lawful activity.

1.2.3 FEDERAL MIGRATORY BIRD TREATY ACT

The eight bird species covered in the HCP, and several other non-listed bird species in the Project vicinity, are protected under the Migratory Bird Treaty Act (MBTA) of 1918, as amended (16 USC 703-712). This act states that it is unlawful to pursue, hunt, take, capture or kill; attempt to take, capture or kill; possess, offer to or sell, barter, purchase, deliver or cause to be shipped, exported, imported, transported, carried or received any migratory bird, part, nest, egg or product. "Take" is defined as "to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect." No process for authorizing incidental take of MBTA-protected birds or providing permits is described in the MBTA (USFWS and NMFS 1996). In this case, if the HCP is approved and the USFWS issues an ITP to the Applicant, the terms and conditions of that ITP will also constitute a Special Purpose Permit under 50 CFR 21.27 and any take of the eight listed bird species would not be in violation of the MBTA.

1.2.4 FEDERAL NATIONAL HISTORIC PRESERVATION ACT

Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended (16 U.S.C. 470 *et seq.*), requires Federal agencies to take into account the effects of their undertakings on properties eligible for inclusion in the National Register of Historic Places. An undertaking is defined as a project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a Federal agency, including those carried out by or on behalf of a Federal agency, those carried out with Federal financial assistance, those requiring a Federal permit, license or approval, and those subject to state or local regulation administered pursuant to a delegation or approval by a Federal agency. The issuance of an incidental take permit under ESA Section 10 (a)(1)(B) is an undertaking subject to Section 106 of the NHPA.

The USFWS will determine the “area of potential effects” associated with the proposed undertaking, which is usually defined as the geographic area where the undertaking may directly or indirectly change the character or use of historic properties included in or eligible for inclusion in the National Register of Historic Places. The USFWS generally interprets the area of potential effects as the specific location where incidental take may occur and where ground-disturbing activities may affect historic properties.

1.3 STATE REGULATORY CONTEXT

1.3.1 HAWAI‘I REVISED STATUTES, CHAPTER 343

HRS Chapter 343 (Environmental Impact Statements) was developed “to establish a system of environmental review which will ensure that environmental concerns are given appropriate consideration in decision-making along with economic and technical considerations” (§343-1). The approval of an HCP and issuance of an ITL under Chapter 195D, do not by themselves trigger a requirement for environmental review pursuant to Chapter 343.

1.3.2 HAWAI‘I REVISED STATUTES, CHAPTER 205

Under the State Land Use Law (Act 187), HRS Chapter 205, all lands and waters in the State are classified into one of four districts: Agriculture, Rural, Conservation, or Urban. Conservation Districts, under the jurisdiction of DLNR, are further divided into five subzones: Protective, Limited, Resource, General, and Special. The use of Conservation District lands is regulated by HRS Chapter 183C and Hawaii Administration Rules (HAR) Chapter 13-5.

All of the property on which measures undertaken in support of the HCP will be within the Urban and Agricultural Districts. The regulation of uses within these two Districts is the responsibility of the County within which they are located.

1.3.3 HAWAI‘I REVISED STATUTES, CHAPTER 198D

Established in 1988, the State Na Ala Hele Trails and Access Program (HRS 198D) is a statewide trail and access program administered by the DOFAW. The primary purpose of this program is to ensure adequate public access to coastal and mountain trails and roads. DOFAW has the authority to regulate the use of trails and access for the following purposes: 1) to preserve the integrity, condition, naturalness, or beauty of the trails or accesses; 2) to protect the public safety; or 3) to restrict public access to protected or endangered wildlife habitats, except for scientific or educational purposes. There are no trails within the area covered by KL’s HCP.

1.3.4 HAWAI‘I’S COASTAL ZONE MANAGEMENT PROGRAM

Hawai‘i’s Coastal Zone Management (CZM) Program (HRS 205A-2) is designed to protect valuable and vulnerable coastal resources by reducing coastal hazards and improving the review process for activities proposed within the Coastal Zone Management Area (CZMA). The CZM Program focuses on ten objectives and policies related to the following: recreational resources; historic resources; scenic and open space resources; coastal ecosystems; economic uses; coastal hazards; managing development; public participation; beach protection; and marine resources. KL is located within the CZMA and consequently a CZM certification is required for Federal actions.

1.4 KAUA‘I REGULATORY CONTEXT

1.4.1 KAUA‘I COUNTY GENERAL PLAN

The General Plan of the County of Kaua‘i establishes policies to govern the future physical development of the county. It lays out the county’s vision for Kaua‘i and establishes strategies (expressed in terms of policies and implementing actions) for achieving that vision. The General Plan

is a direction-setting, policy document, not a regulatory one. It is intended to be a guide for future amendments to land regulations and to be considered in reviewing specific zoning amendment and development applications.

The Līhuʻe District Land Use Map of the County General Plan designates the area covered by the HCP as Open and Resort. The policy for the Open designation is as follows (Section 5.3.1 Policy):

(a) The intent of the Open designation is to preserve, maintain or improve the natural characteristics of non-urban land and water areas that:

(1) are of significant value to the public as scenic or recreation resources;

(2) perform essential physical and ecological functions important to the welfare of surrounding lands, waters, and biological resources;

(3) have the potential to create or exacerbate soil erosion or flooding on adjacent lands;

(4) are potentially susceptible to natural hazards such as flood, hurricane, tsunami, coastal erosion, landslide or subsidence; or

(5) form a cultural, historic or archaeological resource of significant public value.

(b) Lands designated Open shall include: important landforms such as mountains, coastal bluffs, cinder cones, and stream valleys; native plant and wildlife habitat; areas of predominantly steep slopes (20 percent or greater); beaches and coastal areas susceptible to coastal erosion or hurricane, tsunami, or storm-wave inundation; wetlands and flood plains; important scenic resources; and known natural, historic and archaeological resources. Open shall also include parks, golf courses, and other areas committed to outdoor recreation.

(c) Lands designated Open shall remain predominantly free of development involving buildings, paving and other construction. With the exception of kuleanas and other small lots of record, any construction that is permitted shall be clearly incidental to the use and open character of the surrounding land.

The activities that will be undertaken if the HCP is approved are intended to benefit the ecological functions of the area as they pertain to protected species. In doing so, they will help maintain the scenic characteristics of the area. Finally, approval of the HCP will support ongoing resort operations, including the beneficial habitat improvement measures it now has in place. The golf course is an approved use in the Open District. The Kauai Lagoons Resort is a designated resort destination in the General Plan. The proposed habitat conservation measures and the surrounding uses are consistent with that designation.

1.4.2 LĪHUʻE DEVELOPMENT PLAN

The County's Līhuʻe Development Plan (1976) establishes long-range designations for commercial, industrial, residential, and other land uses. The Development Plan is intended to provide the Līhuʻe area with organized and more detailed criteria and standards to implement the objectives of the County General Plan. The Development Plan land use designations in the area covered by the HCP include Agriculture, Resort, Open, and Golf Course. Implementation of the HCP is consistent with the Development Plan's policies for the Niumalu-Nāwiliwili area.

1.4.3 COMPREHENSIVE ZONING ORDINANCE

The County's Comprehensive Zoning Ordinance (CZO) sets forth standards for land development and construction of buildings and other structures in the County. The CZO establishes land use districts and delineates the respective types of permitted uses and the development that can occur in those districts. The measures that are proposed as part of the HCP are all allowed within the zoning districts within which they would occur.

1.4.4 SPECIAL MANAGEMENT AREA

Kauai County has already issued a SMA permit for development identified under the HCP.

1.5 PUBLIC INVOLVEMENT AND AGENCY COORDINATION

The USFWS provided KL technical assistance as they developed their draft HCP. KL has met with local and Federal agencies and non-governmental field biologists over the past several years in its efforts to obtain an ITP from the USFWS and an ITL from the DLNR. The Endangered Species Recovery Committee serves as a consultant to the Board of the Hawaii Department of Land and Natural Resources for matters relating to endangered, threatened, proposed and candidate species. The committee is comprised of two biologists, the chairperson of the Board, the field supervisor of the USFWS, or designee, the field supervisor of USGS BRD, or designee, and the director of the University of Hawaii Environmental Center, or designee. KL has met with the Endangered Species Recovery Committee on a number of occasions regarding the management of listed species at the property. Additional information concerning consultation is included in Chapter 6.0 of this document. The draft HCP and this draft EA will be subject to public review and comment.

2.0 ALTERNATIVES CONSIDERED

NEPA requires agencies to consider a range of reasonable alternatives to the Proposed Action. In conducting its analyses, the USFWS initially considered a number of alternatives. Section 2.1 briefly discusses alternatives that were considered but rejected and were not analyzed in detail. Section 2.2 (the Proposed Action)) and Section 2.3 (the No Action Alternative) describe the two alternatives that are analyzed in depth. The Proposed Action (which is also the Preferred Action) is issuance of an ITP by the USFWS and KL's implementation of the proposed HCP.

2.1 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL

2.1.1 OFFSITE MITIGATION/HABITAT ENHANCEMENT ALTERNATIVE

This alternative has been developed based on comments received from agencies regarding the long-term growth of bird populations at KL, and the threat that bird presence poses to air traffic and human safety at the adjacent Līhu'e Airport. Under this Offsite Mitigation/Habitat Enhancement Alternative, KL would pursue a Habitat Conservation Plan and incidental take authorizations, but the HCP's conservation program would not include any on-site habitat enhancement measures, such as predator control. The construction and maintenance/operation actions that KL would conduct would be identical to that in the preferred alternative, as described in Section 2.2 of this document. By abandoning the current regime of on-site habitat management and enhancement activities, KL would indirectly reduce the quality of its native bird habitat and in turn reduce their rate of breeding success. In effect, this approach would be a passive means of reducing breeding success and thus the Nēnē and waterbird populations on-site, thereby reducing concerns that these species pose a risk to the safe operation of Līhu'e Airport. However, if not done in consort with recovery activities elsewhere, the decline in the Nēnē breeding population at KL may result in a significant reduction in the total Nēnē numbers on Kaua'i and throughout the State.

To ensure that this alternative does not result in a significant loss of Nēnē and other Covered Species, the project would have to incorporate the following recovery activities at an offsite location:

- The offsite mitigation/habitat enhancement alternative would require KL to identify one or more alternate locations at which it could fund and manage conservation activities for Nēnē. This would require land acquisition or cooperative agreements with landowners. Sites would be located on Kaua'i, or on neighbor islands that currently support populations of Nēnē. The site(s) would have to meet specific biological criteria needed for the species, and would require restoration actions, including predator removal, vegetation alteration, and hydrological assessment, as appropriate and as determined by DOFAW and USFWS. Sites would require ongoing maintenance and monitoring.

- Nēnē currently at KL would be relocated to the identified off-site location(s). This action would occur in close coordination with DOFAW and USFWS to ensure that translocation efforts met State and Federal mandates. Translocation of Nēnē to neighbor islands would require the birds go through quarantine procedures to eliminate the transfer of specific avian diseases, such as malaria. A quarantine facility would be constructed at KL or other suitable location, such as the Kauai Humane Society, to facilitate translocation. Once transferred to the new site(s), translocated birds would be extensively monitored to determine health and body condition, dispersal, reproductive productivity, and document results of the relocation effort.

- Despite efforts to move the existing Nēnē breeding population from KL to the new site(s), some level of the population is likely to persist at KL over the long-term, even after stopping current on-site habitat enhancement measures. This may occur because all Nēnē would not be able to be moved in a single year due to logistics and stress on the population. Long-term

persistence of the species at KL may also occur through (1) recruitment of new individuals to KL from other, less productive sites; and (2) return of translocated individuals and their young from new sites. So long as individuals of Nēnē remain at KL, basic monitoring and visitor education would continue.

- Waterbird species currently at KL would not be relocated, and therefore may be subject to additional predation under this alternative. To mitigate for these impacts, KL would conduct restoration activities and predator management at an appropriate wetland site on Kaua‘i. This may require land acquisition or cooperative agreements with landowners.
- Impacts to seabird species covered from this alternative would be minimized by implementing the lighting measures outlined in Section 2.2.5.2. Unavoidable take likely to occur from long-term operation of the resort and golf course will be mitigated through payment into the Kaua‘i Seabird Habitat Conservation Plan (KSHCP), as described in Section 2.2.6.4. Although it is possible that seabirds could pose a threat to the safe operation of Līhu‘e Airport, no attempt would be made to actively haze or dissuade these species away from KL, other than the shielding of lights to remove the basis for attraction. As no seabird species nests at KL, translocation of birds is not a possible action.

The implementation of the above activities would ultimately reduce the threat that the Covered Species pose to the safe operation of Līhu‘e Airport in the long-term. This alternative would also result in reduced action of FAA and HDOT in their effort to address endangered species at the Airport. However, this alternative will require long-term planning, and it is uncertain as to whether these actions would completely remove the risk that birds pose to the Airport, or how long it will take to achieve that goal. Despite planning, it is likely that some population of the Covered Species will persist at KL in the future. Additionally, without proper coordination with wildlife agencies, the actions could result in a significant loss of the Covered Species, which would not meet the goals of this HCP.

Further, the implementation of the above activities would go far beyond the requirements of the Issuance Criteria developed for all HCPs under Section 10(a)(1)(B) of the ESA. One of the five issuance criterion states that “The applicant will, to the maximum extent practicable, minimize and mitigate the impacts of such taking.” Given the level of take likely to occur as a result of KL’s construction and operations, the implementation of this alternative would go far beyond the minimization measures and mitigation needed to adequately address the take of listed species. Although this alternative would benefit multiple agencies and reduce safety concerns, it is financially and logistically impracticable for KL to implement. Due to these difficulties, this alternative is not analyzed further in this document.

Despite the difficulties in KL implementing this alternative, the actions, as described above, may be necessary to address the growing safety concerns present at the Līhu‘e Airport. Currently, these actions are likely to be conducted through a joint-agency cooperative agreement between FAA, HDOT, DOFAW, USFWS, and Wildlife Services. The goal of this working group would be to address safety issues through the translocation of Nēnē to other sites on Kaua‘i and other islands. In the preferred alternative, described in Section 2.2.6, KL would help fund development of this management plan and support the efforts of these actions, but would not be responsible for implementing the entirety of a major translocation plan.

2.1.2 NO TAKE ALTERNATIVE

Under the No Take alternative, KL would make adjustments to its covered activities necessary to ensure that no take of Covered Species would occur, and in turn, KL would not pursue this HCP or seek incidental take authorizations. This may require that the resort cease new construction activities, turn off all exterior and perhaps some interior lighting that might attract seabirds during the autumn seabird fallout season (approximately September 15 to December 15 each year), and cease golf

operations. This alternative is not considered further in this EA because these adjustments are not financially feasible and with respect to lighting restrictions they would unduly compromise public health and safety.

2.2 PROPOSED ACTION -- HABITAT CONSERVATION PLAN ALTERNATIVE

The Proposed Action alternative consists of USFWS issuing KL a 30-year ITP under Section 10(a)(1)(B) of the ESA authorizing incidental take and requiring implementation of a HCP to minimize and mitigate, to the maximum extent practical, impacts to the Covered Species. Issuance of an ITP provides incidental take authorization for the continued existence, operation, and maintenance of all existing KL facilities, and the installation, operation, and maintenance of certain future KL facilities. The relatively long term coverage (up to 30 years) that is being sought follows the expectation that KL will continue to be an attractive habitat for endangered Hawaiian birds for the foreseeable future. Existing facilities and activities are described in Section 2.2.1 below, and future additional facilities and activities are described in Section 2.2.2.

KL has identified this option as the Preferred Alternative because it is most likely to result in positive outcomes for the resort and a demonstrable net benefit for the covered species. Under this alternative, KL would maintain a predator control program, which it currently undertakes on behalf of endangered birds at the present time. Predator control efforts have been demonstrated to result in positive impacts to the bird population at Kauai Lagoons and it is likely they will continue to do so under the Preferred Alternative option.

KL has undertaken habitat management and enhancement activities at the resort since the first five Nēnē nests were discovered there in 1999. As part of these measures, it has tracked the population of Nēnē at the resort as detailed in **Table 3.2**. These numbers indicate that the habitat management and maintenance, predator control, and emergency response measures developed in consultation with DOFAW and USFWS, which have been implemented over the past several years, resulted in significant net benefit to Nēnē at the resort. Under the Preferred Alternative, Kauaʻi Lagoons would continue many of these effective measures, and supplement them by facilitating DOFAW/USFWS translocations and funding the development of a comprehensive draft Nēnē Action Plan. However, given the potential of collisions between airplanes and Nēnē, under the Preferred Alternative KL would not purposefully enhance habitat that would further encourage Nēnē breeding at the site. Given the moderately low level of anticipated take from the Covered Activities, and the success of the actions implemented to date, the collection of measures described in this document (and the HCP it supports) would provide a substantial net benefit to Nēnē.

The predator control efforts detailed in Section 4.4.1.3 of the HCP have also resulted in substantial benefit to all of the covered waterbird species. Researchers have long recognized that predation by cats and rats constitute a significant threat to all of the covered Hawaiian waterbird species (American Bird Conservancy 2006, Pratt and Brisbin, Jr. 2002, Byrd, et al. 1985, Pyle 1985, Berger 1981).

The USFWS have likewise concluded that cats, rats, and other introduced mammals prey upon and constitute a significant threat to waterbirds (USFWS 2005c). U.S. Fish and Wildlife Service, Portland, Oregon (p. 44: predation by introduced animals may be the greatest threat to the coot, moorhen, and stilt; p. 46: the introduction of alien predators has had a negative impact on populations of all four endangered waterbirds, birds on the Hawaiian Islands evolved in the absence of mammalian predators, and are consequently highly vulnerable to these introduced animals; p. 46: feral cats may have a significant effect on waterbird recovery, dogs have become a serious problem in some wetlands particularly near urban areas, rats most likely have a negative effect on the waterbirds as well; Hawaiʻi Department of Land and Natural Resources (DLNR), Comprehensive Wildlife Conservation Strategy (http://www.state.hi.us/dlnr/dofaw/cwcs) (predation by feral cats, dogs and rats constitutes a threat to each of the covered waterbird species); DLNR, Division of Forestry and Wildlife, 2009 brochure entitled "Hawaii's Wetlands" (http://pcjv.org/hawaii/weltands/wetlandsbrochure.pdf) (feral cats and rodents eat native Hawaiian waterbirds).

Control of mammalian predators has proven effective in dramatically increasing waterbird breeding success in Hawai'i. In 1994 the USFWS funded a study to evaluate the effect of predator control on waterbird (specifically Hawaiian Coot, Stilt, and Duck) breeding success at the Kanaha Pond Wildlife Sanctuary on Maui. The study consisted of a 10 week trapping program designed to reduce the predator population, evaluate predator diets with respect to bird predation, document the significance such predation has on the endangered waterbird population, and develop a strategy for a long term trapping program. The trapping effort captured 45 roof rats, 33 Polynesian rats, 8 Norwegian rats, 28 mongooses, and 22 cats. Predator abundance (not mongooses) declined significantly over the course of the project. As an outstanding result, Stilt fledging success increased by more than 400% compared to both 1992 and 1993. Fifty percent of all examined feral cats, 24% of all mongooses, and 21% of all rats (combined results across all three rat species) contained bird material in their stomachs or intestines (Hawaii Conservation Council 1994).

Thus the USFWS, in its Draft Recovery Plan for Hawaiian Waterbirds, identifies the control of feral cats, dogs, and rats as a "Priority 1" recovery action meaning, "An action that must be taken to prevent extinction or prevent the species from declining irreversibly in the foreseeable future." (USFWS, 2005c, pp. 82, 104).

The predator control efforts described in the HCP and in Section 2.2.7 of this document, though focused on Nēnē, will likewise benefit the covered waterbirds. That trapping effort will cover a portion of the covered waterbirds' breeding season. Also, this "pulse trapping" approach is a proven wildlife management technique that is likely more effective at reducing predators on site than a year-round trapping program would be. The actual results of KL's trapping efforts demonstrate that, as fewer feral cats were trapped during the 2009-2010 effort than were trapped during the 2008-2009 effort.

In summary, the combination maintaining important habitat for the covered species, and controlling predation through predator control trapping, combined with the relatively low level of anticipated take, indicates that the Preferred Alternative (including implementation of the HCP and issuance of an ITP) would result in a net benefit to each of the covered species. The Preferred Alternative will allow KL to continue to avoid, minimize, and mitigate any incidental take while maintaining viable business operations.

2.2.1 EXISTING FACILITIES & ACTIVITIES

2.2.1.1 Overview

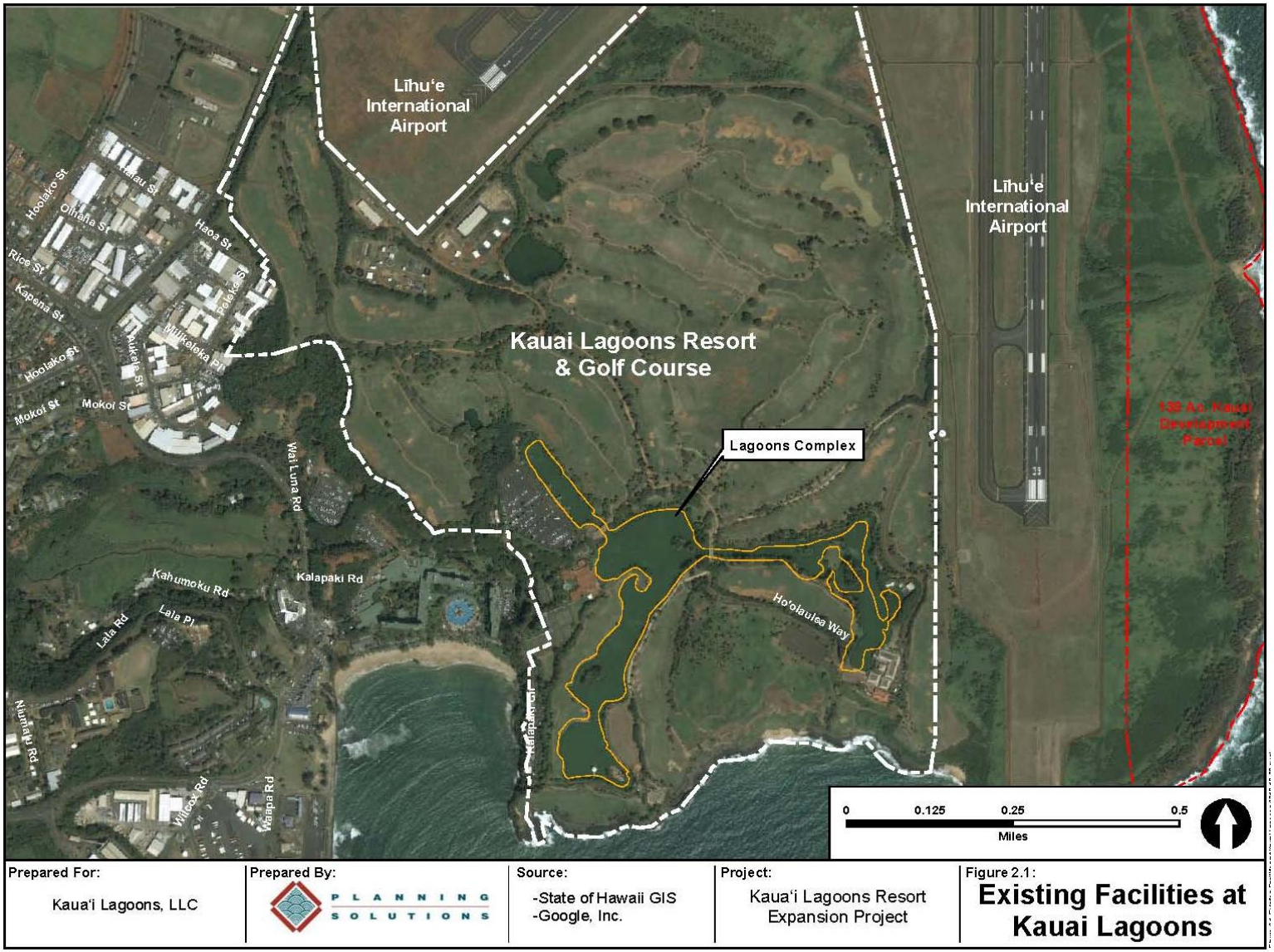
Kaua'i Lagoons LLC owns and operates an approximately 600 acre oceanfront resort and golf course complex in Līhu'e, on the Island of Kaua'i (see Figure 2.1). The existing facilities include:

- oceanfront resort and property;
- two 18-hole championship golf courses;
- golf and racquet club facility;
- network of man-made navigable lagoons;
- restaurant;
- commercial development;
- Kalinipu'u resort complex (3 structures comprising 78 units), and two subdivisions (consisting of a total of 34 finished but currently undeveloped lots); and
- associated parking areas.

2.2.1.2 Ongoing Operation & Maintenance Activities

Existing KL facilities require ongoing maintenance to ensure safe and efficient operation. Most of the activities associated with maintaining KL facilities do not significantly affect the configuration of the existing facilities and environment. Examples of facilities requiring such maintenance include: roadways, cart paths, bike paths, parking lots, sewer lines, utilities, exterior lighting, and resort and clubhouse structures.

Figure 2.1 Satellite Photograph of Existing Facilities at Kaua‘i Lagoons.



Some regular maintenance activities impact areas that have effectively become native bird habitat. One example is operation and maintenance of the man-made, navigable lagoons. Clearing of vegetation must be done occasionally to accommodate intended uses of the lagoon and to maintain its aesthetic value to the resort. Regular mowing and other maintenance activities on the golf course and landscaped areas also have the potential to affect habitat.

Because resort lights could attract certain of the Covered Species listed in the HCP, KL would only conduct work during nighttime hours in emergency situations or when facility conditions require nighttime work. Lighting of the work area will be required in such situations, but all lights would be shielded and directed downward to the maximum extent practicable.

KL workers would continue to be trained in how to handle any downed birds and will have appropriate equipment onsite to hold and transport any retrieved downed birds to an appropriate Save Our Shearwater facility.

2.2.1.3 Implementation of the HCP's Conservation Program

The HCP describes a conservation program which involves affecting the Covered Species. Implementation of all aspects of the conservation program is covered under the incidental take permit.

2.2.2 FUTURE KL ACTIVITIES AND FACILITIES

2.2.2.1 New Facilities

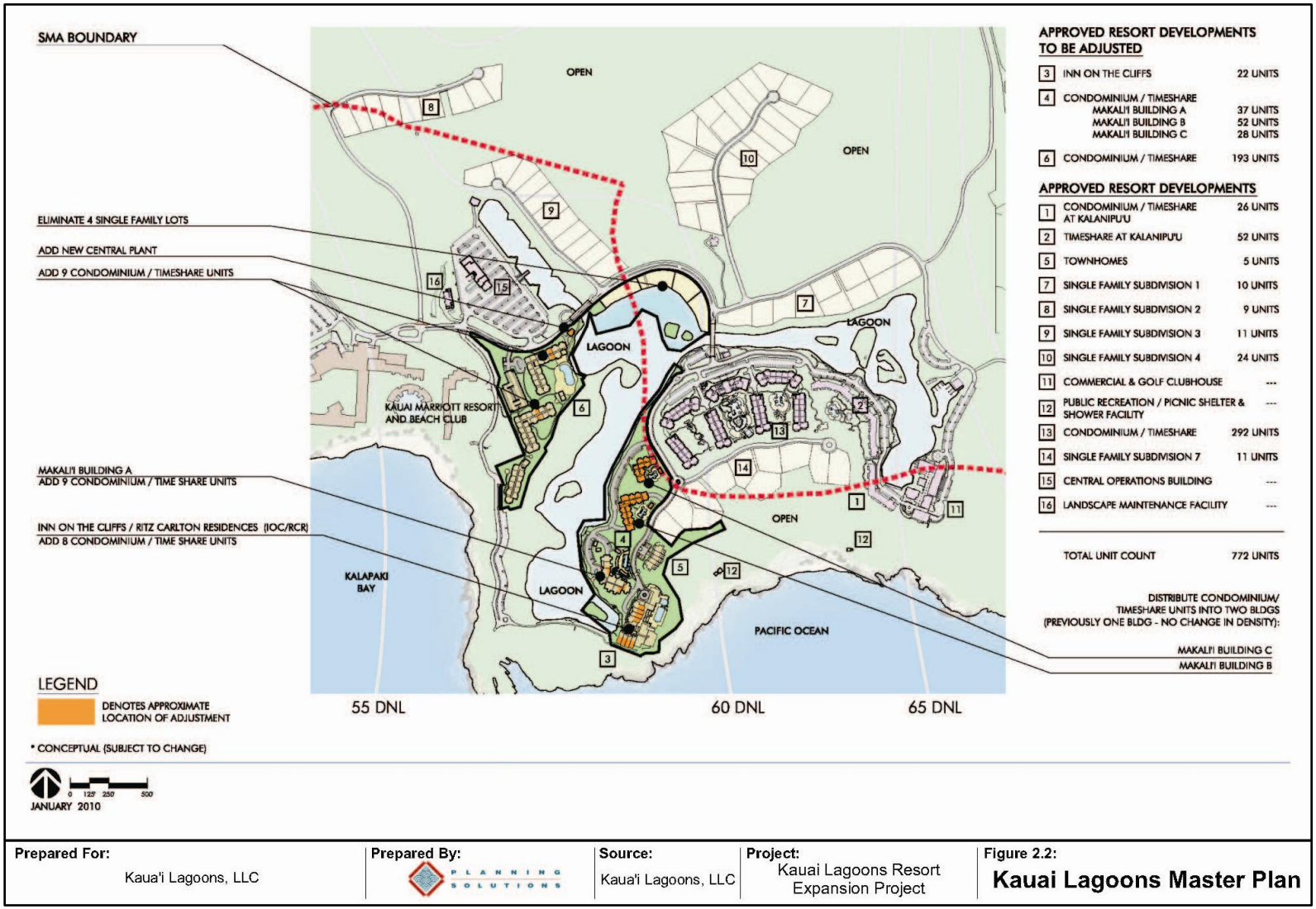
The Applicant is developing additional facilities at Kaua'i Lagoons Resort based on its revised resort master plan, and pursuant to the Special Management Area Use Permit, Project Development Use Permit, Class IV Zoning Permit, subsequent amendments, and other approvals received from the County of Kauai beginning in 2005. The current Master Plan is set forth in Figure 2.2 below.

These projects would result in a total of 772 resort residential units (consisting of 707 condominium/time share units and 65 single-family residential lots), and support facilities including a new golf clubhouse, a 27-hole golf course complex, central operations building with a marketplace/café and administrative office facilities, commercial area, marketplace express-grill kitchen, fitness center, restaurant, public recreational facilities, sales facility, engineering/maintenance building and parking.

Grading and earthmoving activities associated with the complete development project would result in the disturbance of approximately 230 acres of land. Project grading and construction will occur in phases. As of early-2010, approximately 56% of total project grading and infrastructure construction had been completed. Impacts to listed species from activities that have already taken place have been addressed through a Memorandum of Understanding (MOU) between the USFWS and KL, the effects were evaluated through an internal section 7 consultation. The remainder of project grading and construction is expected to continue through 2018. The timing of each construction phase and specific details of building and facility amounts, sizes, and locations may change over time subject to market conditions and subject to any required permit modifications or approvals from the County of Kaua'i.

Both during and after the grading and construction described above, numerous resort operational activities will occur. These include facilities maintenance and repair, landscaping, and ground maintenance, operation of the golf course, etc. similar to the regime of maintenance and operations activities for existing facilities.

Figure 2.2 Kaua'i Lagoons Master Plan.



2.2.2.2 Operations and Maintenance Activities

This EA evaluates the impacts of the following activities which will be subject to any requirements or restrictions described in this document, the HCP, or contained in the incidental take authorizations. The planned activities which are evaluated in this EA include:

- Grading and earth-moving activities associated with new construction.
- Installation and construction of infrastructure associated with new construction projects, including roadways, cart paths, bicycle and pedestrian paths, parking lots, sewer lines, utilities, and exterior lighting.
- Construction of new facilities and reconstruction or modification of existing facilities, including building pads, buildings, swimming pools, water features, tennis courts, golf course complex, recreational picnic shelters, and associated structures, facilities, and access routes.
- Installation of landscaping.
- Driving and biking activities by employees, contractors, and the public that occur on established roadways, sidewalks, and paths in accordance with posted speed limits.
- Operation, management, and maintenance of all existing and newly constructed facilities.
- Operation, management, and maintenance of the golf course complex.
- General property operation, management, and maintenance activities, including landscape and recreational facility maintenance, operation and maintenance of the lagoons, and operation of boats on the lagoons.
- Implementation of the conservation measures described in the HCP document.

2.2.3 BIOLOGICAL GOALS OF CONSERVATION MEASURES PROPOSED IN THE HCP

KL's HCP proposes a number of conservation measures that would minimize and mitigate the potential effect of its facilities and operations. These are designed to achieve the set of biological goals and objectives listed in Table 2.1. Those, in turn, were drawn from a number of sources, including USFWS Recovery Plans, related Five-year Workplans, available scientific literature, State conservation strategies, and consultations with the USFWS, DLNR, and State Endangered Species Recovery Committee members. Because implementation of these measures has the potential to affect the surrounding environment, their potential impacts are also addressed in this document.

Table 2.1 Biological Goals and Objectives of Proposed Conservation Measures

Biological Goals	*Biological Objectives*
<u>*Goal 1*</u>. Avoid and minimize impacts of new construction activities on the eight Covered Species.	1.A. Provide comprehensive endangered species awareness training to all construction personnel and resort employees. 1.B. Deploy construction and biological monitors during construction operations to prevent harm to species covered by the HCP. 1.C. Develop and implement specific construction Best Management Practices (BMPs) to prevent harm to Covered Species.
<u>*Goal 2*</u>. Avoid and minimize impacts of resort operations on the Covered Species.	2.A. Provide comprehensive endangered species awareness training to all resort employees. 2.B. Develop and implement specific operational BMPs to prevent harm to species covered by the HCP. 2.C. Develop and implement a program to educate golfers about the presence of Covered Species on the golf course, and measures to take to avoid harm to Covered Species. 2.D. Implement a program to minimize light-induced attraction of seabirds to resort facilities through the selection and installation of appropriate lighting fixtures, and implementation of appropriate seasonal lighting restrictions and practices.
<u>*Goal 3*</u>. Manage the Nēnē population at the resort to provide a net benefit to species recovery, and work toward an overall reduction in Nēnē frequenting the resort property.	3.A. Implement appropriate BMPs to prevent harm to Nēnē from resort construction and operations. 3.B. Accommodate breeding by established breeding pairs through predator control measures. 3.C. Facilitate and cooperate with Nēnē translocation efforts undertaken by DOFAW or the USFWS. 3.D Manage grounds and vegetation where possible to minimize attractiveness to Nēnē.
<u>*Goal 4*</u>. Provide a net conservation benefit for the recovery of the Hawaiian Duck, Hawaiian Moorhen, and Hawaiian Stilt.	4.A. Implement construction and operations BMPs to prevent harm to these Covered Species. 4.B. Implement specific measures to manage appropriate on-site habitat for these Covered Species.
<u>*Goal 5*</u>. Maintain healthy seasonal populations of Hawaiian Coots at the resort.	5.A. Implement construction and operations BMPs to prevent harm to this Covered Species.
Source: Compiled by Planning Solutions, Inc/ from Section 4.1 in Draft HCP.	

2.2.4 MEASURES TO AVOID AND MINIMIZE IMPACTS TO COVERED SPECIES: CONSTRUCTION

2.2.4.1 New Construction

KL would implement measures to avoid and minimize the impacts to the Covered Species associated with new construction of the project site. These measures are based on the extensive experience and knowledge gained by USFWS, DOFAW, and KL during the 2007-2008, 2008-2009, and 2009-2010 nesting seasons.

2.2.4.2 Endangered Species Awareness Program

In preparation for the 2008-2009 nesting season, an Endangered Species Awareness Program training session was developed, and used to train every employee, salesperson, manager, construction contractor, and trade contractor working at the resort. This program was developed by KL in cooperation with USFWS and DOFAW. The program was updated to reflect new information and the changes to the construction project prior to, and following the end of, the 2009-2010 Nēnē nesting season.

Prior to the onset of the 2010-2011 Nēnē nesting season, all new employees and construction personnel would be required to complete this updated training program. KL would require every new employee or construction contractor working at the resort to complete this training program. The Endangered Species Awareness Program is reproduced in Appendix 2 of the HCP document.

2.2.4.3 Endangered Species Construction Contract Provisions

KL would implement provisions and restrictions (such as the BMPs described below) to avoid and minimize take of the Covered Species, which will apply to all construction activities that occur in areas where the Covered Species may be present. These provisions would be incorporated into construction contracts for these activities.

2.2.4.4 Pre-construction Endangered Species Surveys

A biological monitor (discussed below) would conduct surveys of any new mass grading areas immediately prior to the grading activity. The surveys would be of appropriate length and duration to confirm that the Covered Species are either present or absent. If any of the Covered Species are observed, their locations and band combinations (if banded) would be recorded, and grading would not be allowed to proceed until such individuals have left the grading area as described in Section 4.2.1.5 of the HCP document.

If any of the Covered Species are observed to be nesting, grading would not be allowed to occur within 500 feet of the nest and the biological monitor(s) will immediately contact DOFAW and the USFWS. DOFAW and the USFWS would promptly determine, in coordination with the biological monitor(s), the appropriate buffer area around the nest within which no grading or earth-moving activity may occur so long as nesting activity is ongoing. Grading and earth-moving activity outside of the determined buffer area may then resume once it has been determined that nesting activity is completed and pair (with goslings if hatched) have moved away. Nesting pairs must not be disturbed or eggs moved. Any such buffer zone would be appropriately marked with construction fencing, flagging, or similar means. The buffer would remain in place until nesting is completed and any goslings have fledged, or the nest fails, or the nesting adults and their goslings have been removed and translocated by and in coordination between DOFAW and the USFWS.

2.2.4.5 Biological Monitors

KL would designate at least two individuals as biological monitors at the resort. These individuals would be trained biologists or otherwise qualified to serve in this role. The biological monitors would be responsible for performing the predator control, biological monitoring, and other similar

functions described in the HCP and this EA. They would also coordinate any Covered Species translocations activities undertaken by the USFWS and DOFAW.

2.2.4.6 Construction Monitors

During all periods of active grading or earth-moving activity, KL would deploy one or more construction monitors on the project site. Persons designated as biological monitors may also perform the same responsibilities as construction monitors. Construction monitors are responsible for observing grading, earth-moving and general construction activity, and ensuring to the best of their ability that such activity does not adversely affect any Covered Species. The construction monitors would complete Endangered Species Awareness Program training described above, and would also be trained in the field on the project site by the biological monitors.

The construction and biological monitors would be authorized to, and would, halt construction activities when they anticipate that any aspect of grading, earth-moving, or other construction activities pose a threat of harm to any of the Covered Species. In such instance, the construction or biological monitor(s) would continue to observe the bird(s) in question and one of three things may occur. First, the species may move of its own accord such that the threat is abated. This is the preferred outcome of the USFWS, DOFAW, and KL. Second, if the observed species does not voluntarily leave the area, it may be encouraged to relocate in a non-harmful manner (i.e., without any physical contact). Third, if the species cannot be ushered from the area, it may be physically relocated out of the construction area by the biological monitors with DOFAW approval, by other qualified biologists with DOFAW approval, by DOFAW Kaua'i Wildlife Manager's staff, and by a USFWS biologist. Construction activity may resume when the biological monitors observe that the species has left the immediate construction area.

2.2.4.7 Fencing

Where the size and location of the construction sites make it practicable, KL would erect and maintain solid fencing around discrete construction areas in order to exclude the Covered Species from entering these areas. Depending upon site-specific conditions, such fencing could consist of silt fencing, solid wood fencing, or other equivalent types of fencing. All such fencing would be inspected daily and repaired when necessary.

2.2.4.8 Construction Related Best Management Practices (BMP)

The following BMPs would be implemented to ensure that construction parking, traffic, food and beverage trash, and other peripheral construction activities do not harm any Covered Species on the project site:

- KL, in consultation with a biological monitor, will designate one or more personal vehicle parking areas for construction personnel, away from areas where Nēnē or other Covered Species are known to regularly occur or nest. All other areas will be off limits for parking.
- A speed limit of 15 miles per hour will be enforced for all vehicular traffic within the project area. Speed limit signs will be posted by KL throughout the project area.
- KL or its contractors will provide appropriate trash receptacles with lids and recycle containers at construction sites within the project area, and ensure that food scraps, beverage containers, and all other trash are properly disposed of.
- Signage will be erected delineating speed limits, parking areas, food disposal sites, and Nēnē caution signs.
- KL will continue to install permanent roadside signs that display the speed limit and the phrase "Slow Down Wildlife Crossing" with a photo of a Nēnē silk screened onto the sign. In addition, free standing sandwich board signs that have the same message on one side, and the phrase "Please Do Not Feed the Nēnē" on the other side will be used in areas where Nēnē are observed

congregating. Warning signs attached to poles will be located close to every nest within the resort, with the phrase "Nēnē Nest – Do Not Approach" and an image of a Nēnē on the sign.

- No nighttime construction requiring outdoor lighting shall occur during the annual seabird fallout season of September 15 to December 15.
- If any nest in ongoing use by a Covered Species is found within an active grading, earth-moving or construction area, all such activity within 500 feet of the nest will be immediately halted and the biological monitor(s) will immediately notify DOFAW and the USFWS. DOFAW and the USFWS will promptly determine the appropriate buffer area around the nest in consultation with the biological monitors. Within this buffer no grading or earth-moving activity would occur so long as nesting activity continues. Grading and earth-moving activity outside of the determined buffer area may then resume once it has been determined that nesting activity is completed and pair (with goslings if hatched) have moved away. Nesting pairs must not be disturbed or eggs moved. Any such buffer zone will be appropriately marked with construction fencing, flagging, or similar means. The buffer will remain in place until nesting is completed and any goslings have fledged, or the nest fails, or the nesting adults and their goslings have been removed and translocated by and in coordination between DOFAW and the USFWS.
- For any other nest actively used by a Covered Species within the project area that could be affected by construction activity, KL will consult with DOFAW and the USFWS biologists to determine whether any additional protective measures are appropriate.

2.2.5 MEASURES TO AVOID AND MINIMIZE IMPACTS TO COVERED SPECIES: RESORT OPERATIONS

2.2.5.1 Roadways

Consistent with the measures described in Section 2.2.4.8 above, KL would post permanent signage on all roadways stating that the speed limit is 15 mph and install Covered Species warning signs throughout the resort property. KL would also install speed bumps on resort roadways wherever necessary to ensure compliance with the posted speed limit.

2.2.5.2 Lighting

Prior to the construction of structures on the site, KL consultants would meet with the architects, electrical engineers, and lighting designers to ensure that all lighting associated with the proposed resort development, including parking areas and accent lighting, is bird friendly. Any external lighting would be only of the following three types: shielded lights, cut-off luminaries, or indirect lighting. Spotlights aimed upward, or spotlighting of structures and landscaping on the project site, shall be prohibited[3].

As buildings near completion and become electrified, lighting for each building would be inspected after dark by a qualified biologist with experience in nocturnal seabird issues in Hawai'i. The biologist would determine if any modifications to lighting are needed (e.g., fixtures, bulbs, lighting direction, shielding etc.) to ensure that all measures have been taken to minimize the potential impacts of light attraction to night flying seabirds to the maximum extent practicable.

As part of the seabird fallout monitoring program, KL's biologists would analyze the onsite seabird fallout monitoring data on an ongoing basis to determine if any particular lighting or lit areas within the resort development attracts or downs birds on a regular basis. If this is found to be the case, steps will immediately be taken to re-design, re-configure or eliminate any potential light attraction sources that may be responsible.

[3] These requirements are also contained in Kaua'i County's SMA Conditions of Approval.

2.2.5.3 Grounds Management and Maintenance

The HCP addresses the following steps to avoid and minimize potential impacts of grounds management and maintenance activities on the Covered Species:

- All grounds management and maintenance personnel would be required to attend the Endangered Species Awareness Program training described above *each year*.
- Biological monitors would notify grounds management and maintenance personnel to avoid areas known to contain active nests or high concentrations of Covered Species.
- All grounds management and maintenance personnel would be instructed to contact one of the biological monitors before proceeding with any particular grounds management or maintenance activity that has the potential to adversely affect any of the Covered Species. For example, should grounds crews observe Covered Species nesting in an area they intend to mow or otherwise work on, they would contact a biological monitor for instructions prior to proceeding with such work.
- In the event that grounds management and maintenance personnel observe any injured or dead member of a Covered Species, they shall follow the Emergency Response Protocol attached to the HCP document as Appendix 1.
- KL will continue to use topical treatments, such as herbicides, as necessary to establish and maintain golf course grass; use of these treatments are subject to Environmental Protection Agency (EPA) labeling and regulations.

2.2.5.4 Owners and Private Facility Operations

As various portions of the overall resort development projects are completed, owners and residents of the resort would be informed of the various endangered species issues, restrictions, and special rules. Several avenues would be used to educate, instruct, and require compliance with these measures as specific conditions associated with the HCP application. The principle vehicle for ensuring compliance would be through the Covenants, Conditions, and Restrictions (CC&Rs) that would be part of the contractual requirements associated with property ownership at KL.

Once the project is completed, KL would use several avenues to educate, instruct, and require compliance with specific conditions associated with this application for all of its new resort owners and residents. The owners and residents would be educated on the various endangered species issues, restrictions, and special rules associated with complying with the terms of the permits that KL is seeking. The principle vehicle for ensuring compliance will be through the CC&Rs that would be part of the contractual requirements associated with ownership of property within the development.

Issues such as appropriate trash receptacles, disposal of trash, landscape design, and maintenance would be included in the CC&Rs. The project plans to restrict owners to two pets per condominium, and require that all pets remain on a leash whenever outside. Walking pets would also be restricted to areas designated by KL. It would also enforce Kauai County ordinance and KL leash laws for both dogs and cats. Security guards at the KL property would identify and report animals subject to the law to County law enforcement and to the Kauai Humane Society. Condominium owners are subject to the pet-related provisions of the CC&Rs noted above. Owners that violate these provisions are subject to enforcement action by KL and condominium board.

A mandatory architectural review process is required for all private residences constructed at KL. As part of this review process, specific structural, design, and lighting restrictions associated with the minimization of impacts to listed species would be enforced by the architectural design review committee.

KL would develop several endangered species information and education tools that will be used to educate owners and visitors to the resort regarding endangered species issues, restrictions, and special seasonal protocols. It is envisioned that the following tools will be developed and distributed:

- A general Endangered Species Awareness Program to be shown on the dedicated resort information channel.
- An additional television module addressing seabird fallout to be shown on the dedicated resort informational channel during annual seabird fallout season.
- A printed endangered species awareness brochure to be included in sales materials, and as part of the in-room and condominium amenities.
- An additional brochure or information packet will be developed regarding seabird fallout and the Save Our Shearwater Program which will be included in the sales material, and as part of the in room, and condo amenities.
- The various informational products will be resupplied as needed by housekeeping staff.

2.2.5.5 Golf Operations

As part of the ongoing development project, KL would convert the resort's two existing 18-hole golf courses into a single, 27-hole course. Avoidance and minimization measures associated with golf course construction and reconfiguration are addressed in Section 2.2.4. KL would take the following measures to avoid and minimize impacts on the Covered Species associated with the operation of the golf course:

- Golf course management and maintenance crews would observe all the measures described in Section 2.2.5.3.
- In addition to the standard Endangered Species Awareness Program training that all KL personnel would be required to undergo, all golf course starters and marshals shall receive additional training from the biological monitors to ensure that they can identify the Covered Species; are knowledgeable about relevant Covered Species behaviors; identify likely areas of occurrence; employ measures that can be taken to avoid and minimize harm to the Covered Species; implement non-harmful means which can be used to encourage the Covered Species to leave areas in which they may be at risk of harm; and appropriate measures to take in response to any observed injury to a member of the Covered Species. The starters and marshals would always carry a two-way radio and/or cell phone, and the phone numbers of the biological monitors, so they can immediately consult with them in the event any urgent situations arise.
- Each day all KL golf operations personnel would participate in a morning briefing, which would include an update on observed Covered Species occurrences, locations, behavior, etc.
- The golf course starter (who must clear every golfer before they proceed onto the course), would inform every golfer about the potential presence of the Covered Species on the course, their protected status under the ESA and Chapter 195D, the need to take all appropriate precautions to avoid causing harm to any Covered Species, and about the local rule (discussed below) applicable to play in areas where the Covered Species are nesting. KL would erect an educational kiosk at the starter location, which will include large color photographs of the Covered Species to be used as part of the educational briefing for all golfers.
- If any of the Covered Species are observed transiting through areas of the golf course where they may be at significant risk of injury from golf play, the starters or marshals may temporarily halt play in that location and allow the birds to voluntarily move out of harm's way, and/or they may gently encourage the birds to relocate in a non-harmful manner (i.e., without any physical contact).
- If any individuals of the Covered Species are observed congregating and remaining on areas of the golf course where they may be at significant risk of injury from golf play, the golf course starters or marshals may encourage these birds to relocate in a non-harmful manner. If the birds in question do not relocate, they may be physically relocated by the biological monitors with DOFAW

approval, other qualified biologists with DOFAW approval, DOFAW Kaua'i Wildlife Manager's staff, and by a USFWS biologist.

- Each golf cart would contain a laminated placard which replicates the key information contained at the educational kiosk.
- Each golf cart would be equipped with a Global Positioning System (GPS) unit which players use during the course of play as they navigate the golf course. These GPS units would display a reminder about the Covered Species twice during each 9 holes of play (for a total of four times during a full round of 18 holes of play). Golfers would be required to acknowledge these reminders.
- If golf operations personnel observe that a Covered Species has established a nest within the golf course, golf operations would notify the biological monitors and erect appropriate warning signs near the nest to warn golfers. The starter will also point out these posted locations to all golfers as part of the educational briefing.
- KL would officially adopt a "local rule" for golf play, which would prohibit golfers who hit a ball in the immediate vicinity of a nesting Covered Species during nesting season to retrieve the ball. Instead, the golfer would be allowed to move to the nearest point of relief away from the nest area. The starter would describe this local rule to all golfers as part of the educational briefing, and this local rule would be printed on the score card provided to each golfer.
- All golfers would be instructed to immediately contact the marshal or starter if they observe an injured Covered Species, or if any concerns about any of the Covered Species arise during the course of golf play.
- If any golf operations personnel observe any dead or injured member of a Covered Species, they would implement the Emergency Response Protocols attached to the HCP document as Appendix I.

2.2.5.6 Sales and Marketing

The KL sales and marketing department is responsible for selling the new residential units being constructed at the resort. Approximately 50 members of that department would be on the resort property daily, providing information to prospective purchasers, conducting tours, etc. These activities are not expected to adversely affect or result in take of the Covered Species. However, KL would take the following steps to avoid and minimize the potential impacts on Covered Species:

- All sales and marketing personnel would be required to attend the Endangered Species Awareness Program training described above.
- Biological monitors would notify sales and marketing personnel to avoid areas known to contain active nests or high concentrations of Covered Species.
- All sales and marketing personnel would be instructed to contact one of the biological monitors before conducting any activity which has the potential to adversely affect any of the Covered Species.
- In the event that sales and marketing personnel observe any injured or dead member of a Covered Species, they would follow the Emergency Response Protocol attached to the HCP document as Appendix I.

2.2.6 MEASURES TO MITIGATE FOR UNAVOIDABLE IMPACTS TO COVERED SPECIES

Despite measures taken by the KL to minimize the effects that its activities will have on covered species, some unavoidable take will continue to occur. In addition to the avoidance measures described above, the following mitigation measures have been proposed in KL's HCP.

2.2.6.1 Facilitate DOFAW/USFWS Translocation and Population Management

Captive breeding has historically been an important component of the overall USFWS and DOFAW strategy for recovering the statewide Nēnē population to a level where it is no longer either threatened or endangered. As the captive breeding program will not be continued in the future, the habitat at the resort and the Nēnē that nest there contribute to the recovery of the species. Given long-standing concerns about this population growth posing a risk to aircraft operating at the adjacent Līhuʻe International Airport, DOFAW and the USFWS have translocated Nēnē from the resort to other locations. As appropriate, KL has agreed to lend appropriate on-site support to USFWS and DOFAW for their translocation efforts by providing and facilitating site access, providing information about recent bird locations and behavior, etc. The capture, handling, relocation, care and feeding, and ultimate release of translocated birds would be performed solely by DOFAW and/or the USFWS, and not by KL.

2.2.6.2 Develop Draft Action Plan for Nene at KL (Action Plan)

To date, DOFAW translocations of Nēnē from KL have been performed on an ad hoc basis. The ability to systematize and continue the translocations is hampered by the absence of a comprehensive management plan and detailed protocols. In order to be able to implement sensible and timely decisions on Nēnē management at KL, an island-wide Nēnē management plan is necessary. The Governor of the State of Hawaii signed a proclamation on April 14, 2011 that would exempt Nēnē at KL from state endangered species laws so that DOFAW may act as quickly as possible to reduce the population through translocation to the islands of Maui and Hawaii.

To assist USFWS and DOFAW develop this plan, KL would retain a professional consultant with appropriate Nēnē and biological experience to develop an agreed on comprehensive draft Action Plan for Nēnē at KL (or KL would provide the agencies with $125,000 which they will use to develop the Action Plan). The Action Plan would provide a specific translocation and monitoring protocol; identify recommended areas for expanding or establishing new Nēnē populations; describe necessary agency budgeting, staffing, and facilities; list permissions, agreements, and permits needed to implement the Action Plan; and provide for scheduling, adaptive management, and corrective actions. Implementation of the plan would reduce Nēnē-human conflicts with respect to Kauaʻi airports while providing for recovery of the wild Nēnē population in the state. The draft Action Plan would assist the wildlife agencies' Nēnē recovery efforts, as identified in the USFWS Revised Draft Recovery Plan for Nēnē and DOFAW Comprehensive Wildlife Conservation Strategy, USFWS, and DOFAW would be responsible for finalizing and then implementing the Action Plan consistent with statutory authorities and appropriated funds. KL's obligation would be complete upon delivery of the final draft Action Plan to DOFAW and USFWS (or upon providing the agencies with a total of $125,000 for their use in developing the Plan), which KL estimates would cost between approximately $100,000 and $125,000.

2.2.6.3 Continued Maintenance of Enhanced Waterbird Habitat

The covered waterbird species that are present at KL began to colonize the property in the 1990's, likely attracted to the large lagoons and adjacent grassy areas. These waterbird species have maintained a significant, and sometimes seasonal, presence at the site since that time. Were it not for ongoing maintenance of the approximately 35-acres of lagoons and surrounding area, the waterbird habitat (and the wildlife benefits that it provides) would eventually disappear. Thus, KL provides a benefit to all of the covered waterbirds, especially Hawaiian Coots.[4]

The predator control efforts that KL is proposing to conduct under the HCP would also provide a benefit to all of the covered waterbird species. Control of mammalian predators has proven effective in dramatically increasing waterbird breeding success in Hawaiʻi. The USFWS' draft Recovery Plan

[4]Kauaʻi Lagoons provides important seasonal, dry season habitat for the coots, and critically important aquatic habitat in drier winters when suitable habitat is not available on Niʻihau.

for Hawaiian Waterbirds identifies the control of feral cats, dogs, and rats as a "Priority 1" recovery action (USFWS, 2005:82 & 104).[5] While the predator trapping efforts that KL would carry out is focused primarily on Nēnē, it will include a portion of all of the covered waterbirds' breeding season. The combination of providing and maintaining important habitat for the covered waterbirds and reducing predation through trapping, would more than offset the unintended take. Consequently, implementation of the measures in the HCP will likely result in a net benefit to each of the covered waterbird species.

2.2.6.4 Seabird Mitigation

No take of covered seabirds is known to be occurring at the resort. However, the future construction and occupation of new buildings at the resort will increase the potential light-attraction take. Whether such take will actually occur in the future, and if so at what frequency, is unknown. Nevertheless, KL has committed to mitigation on the assumption that take could occur in the future as additional resort buildings are constructed and occupied. Based on the current development schedule, the potential for light-attraction take at the resort will begin to increase in September 2014, when occupancy of the Marriott Vacation Club (the three-building complexes located on each side of Phase 1) begin to be occupied.

Although eventual build-out of the resort will include the construction of additional condominiums, townhomes, single family homes and other facilities, for purposes of providing a conservative estimate of potential future seabird take KL assumes for purposes of this HCP that the potential for light-attraction take at the resort will increase incrementally with the completion and occupancy of each of the three phases of the Marriott Vacation Club project, and reach its maximum level upon completion of Phase 3. To mitigate this potential take, KL would make a financial contribution to the mitigation program being created by the Kaua'i Seabird Habitat Conservation Plan (KSHCP) currently being developed by DLNR.[6] The exact amount of that financial contribution, currently forecast by DLNR to be approximately $10,000 per fledgling seabird take per year, would be whatever final per-bird per-year amount is finally approved by DLNR/DOFAW and the USFWS. The KSHCP intends to pool mitigation payments from numerous applicants, and utilize that money to perform habitat management and predator control work in several seabird breeding colonies on Kaua'i. The KSHCP is expected to be finalized and approved by the agencies by late 2011 or early 2012, well in advance of KL's need to mitigate for potential take which (would not arise until at least 2014). The initial mitigation payment would be for one fledgling per year, but the annual payments would increase to reflect the potential take of three fledglings per year by September 1 of the year in which Phase 3 of the Marriott Vacation Club is completed. For each subsequent year that this HCP remains in effect, KL would continue to make annual payments to the KSHCP at the rate of three seabird fledgling takes per year for the duration of the HCP unless it is amended).

2.2.7 MONITORING

The ongoing monitoring of management efforts, bird presence, nesting, recruitment, predator control, and incidental take of the Covered Species that are part of the proposed HCP would provide the information that will be needed to measure the success and the results of the various management actions that KL is, and would continue to implement on the site. KL would design, and implement the following monitoring program and/or approved revisions; it would submit an annual HCP compliance and monitoring report to the agencies by September 30 each year.

[5] A "Priority 1" recovery action is defined as: "An action that must be taken to prevent extinction or prevent the species from declining irreversibly in the foreseeable future."

[6] If the KSHCP program is not available, or the actual KSHCP mitigation costs greatly exceed the anticipated costs as described in this section, KL would have the option of pursuing an alternative form of mitigation, which would require DOFAW and USFWS approval.

2.2.7.1 Habitat Management Monitoring

As discussed above, the goal of on-site habitat management is to ensure that on-ground management actions associated with maintaining the vegetation on the KL property as well as on the golf course continues to provide nesting and foraging habitat for the four waterbird Covered Species. However, given the potential of collisions between airplanes and Nēnē, KL would not purposefully enhance habitat that would further encourage Nēnē breeding at the site. Any future changes to the general habitat management and maintenance activities on the property would depend upon future decisions by the USFWS and DOFAW, in conjunction with the Nēnē Recovery Action Group, regarding the degree to which the on-site Nēnē population should be reduced. The results of the Nēnē and other waterbird species monitoring and reporting would serve as the main indicator as to whether appropriate habitat management is occurring.

2.2.7.2 Predator Control Monitoring

The onsite biological monitors would keep a detailed log of predator control efforts and results, which would be submitted in the annual HCP implementation and monitoring report.

2.2.7.3 Bird Monitoring

2.2.7.3.1 Duties of Construction and Biological Monitors

As discussed in Sections 2.2.4.5 and 2.2.4.6 there are differences between the duties of biological monitors and construction monitors. Biological monitors are trained biologists or other qualified professionals who are responsible for monitoring the Covered Species, conducting predator control, and executing the habitat conservation functions outlined in the HCP and this EA. Construction monitors are individuals who have participated in the Endangered Species Awareness Program and are responsible for observing grading, earth-moving, and construction activities, thereby ensuring that construction activities do not adversely affect the Covered Species. Biological monitors may act as construction monitors; however construction monitors are typically not qualified to act as biological monitors. Both construction monitors and biological monitors are authorized to stop construction activities wherever and whenever they perceive a threat is posed to the Covered Species by these activities.

2.2.7.3.2 Nēnē Monitoring

The onsite biological monitors will monitor Nēnē nesting activity, and nesting success, on a daily basis starting September 15 and ending on March 31 each year (or later if that year's nesting season is protracted). The monitoring would include band numbers, pair bonds, nest location, eggs laid, eggs hatched and goslings fledged, as well as all recorded mortalities. All data collected would be entered into a database. In addition to daily monitoring during the nesting season, KL would also perform monthly monitoring during the remainder of the year (April through August).

2.2.7.3.3 Waterbird Monitoring

While carrying out the comprehensive Nēnē monitoring, the onsite biological monitors would also record information (e.g., waterbird numbers, nest locations, number of eggs laid, eggs hatched and goslings fledged, as well as all recorded mortalities) about all observed covered waterbird species on the resort property on a weekly basis between September 15 and ending on March 31 each year, and on a monthly basis from April through August. These data would also be entered into the comprehensive monitoring database.

2.2.7.3.4 Seabird Monitoring

The KL security staff, who would receive training specifically regarding seabirds and their proper care and handling, would record all downed seabirds recovered on the resort property. These records would include location, time, condition of the bird (i.e., apparently unharmed, injured, dead), and any apparent proximal cause of the individual downing incident. These data would be entered into the comprehensive monitoring database. In addition, KL would request that a DOFAW/KHS SOS Aid Station be placed on-site during the fallout season each year.

2.2.8 FUNDING

Implementation of the obligations contained in this HCP will result in the one-time and annual costs shown in Table 2.:

Table 2.2. Estimated Costs of Implementing the HCP

One-Time Costs:	
Develop Draft Kaua'i Nēnē Action Plan	$125,000
One-time equipment costs	$10,000
TOTAL One Time Cost	$135,000
Annual Costs:	
Endangered Species Awareness Program (update and training)	$3,000
Pre-construction surveys	$2,000
Biological monitor(s)	$36,667
Construction monitor	$52,000
Fencing	Covered by contractors
Signs	$500
Television programming, brochures	$1,000
Maintain enhanced on-site nesting areas	$1,000
Predator control	$50,400
Seabird mitigation payments to KSHCP[1]	$30,000
Annual HCP implementation report	$5,000
Monitoring during Nēnē nesting season	Covered under HCP Section 4.2.1.4
Monitoring outside of Nēnē nesting season	$5,000
DOFAW monitoring	$10,000
Equipment maintenance, miscellaneous supplies	$2,500
TOTAL:	$199,067
Note 1: The exact amount will be determined by the KSHCP, and will be phased in with an anticipated start date of September 1, 2014.	

Kaua'i Lagoons commits to including a line item for complete HCP implementation into its annual operating budget for the life of the HCP. In addition, pursuant to HRS 195D-4(g), Kaua'i Lagoons would post a bond to ensure funding will be available to perform the implementation tasks and obligations noted above.

2.3 NO ACTION ALTERNATIVE

The No Action Alternative consists of non-issuance of an ITP by the USFWS for KL's facilities and activities. Under this alternative, any take of Covered Species resulting from KL's facilities and activities would not be authorized under the ESA or HRS Chapter 195D. The "No Action" alternative would involve no new efforts on KL's part to minimize or mitigate take of Covered Species.[7] Should any take of Covered Species occur in the absence of ESA and HRS Chapter 195D authorization, KL could be exposed to civil or criminal liability. The No Action alternative does not support KL's fundamental purpose and objective as a business entity.

Under the No Action Alternative, KL would not further pursue the HCP or seek incidental take authorizations. KL would not further pursue new construction activities, but it would continue to operate the Resort and its existing facilities. This alternative is not practicable because (1) unavoidable take of Covered Species may occur as a result of ongoing and necessary resort operations (e.g. grounds management and maintenance, golf operations, etc.), but would neither be minimized, mitigated, nor authorized; and (2) the new construction activities are needed to maintain the financial viability of the resort.

3.0 ENVIRONMENTAL SETTING

3.1 INTRODUCTION

This chapter provides an overview of the existing environment on Kaua'i. It is divided into three main parts:

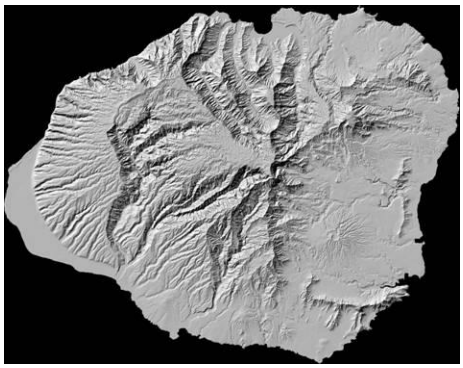
- Section 3.2 discusses the physical environment, including physiography, geology, soils, hydrology, climate, and air quality.
- Section 3.3 covers the overall biological environment.
- Section 3.4 provides an overview of Kaua'i's socio-economic environment and land use.

Additional information relating to each of these is presented where appropriate in the discussion of potential impacts presented in Chapter 4 of this document.

3.2 PHYSICAL ENVIRONMENT

3.2.1 PHYSIOGRAPHY, CLIMATE, AND GEOLOGY

3.2.1.1 Physiography



The island of Kaua'i is the oldest and fourth largest of the main Hawaiian Islands. It has a land area of slightly more than 550 square miles. Roughly circular in shape, its most striking physiographic features are a high central plateau topping out at over 5,000 feet at the summits of Wai'ale'ale (5,148 feet) and Kawaikini (5,243 feet), steep cliffs and deeply incised valleys along the northern Nāpali coast, the 3,600-foot deep Waimea Canyon, the broad Līhu'e basin on the southeastern quadrant of the island, and extensive coastal plains. These can be seen on the shaded relief map to the left.

3.2.1.2 Project Location

The Kaua'i Lagoons Resort is located on the southeastern shore of Kaua'i, approximately one mile southwest of Līhu'e. As shown in Figure 1.2, the resort is immediately adjacent to the Līhu'e International Airport, and completely within the angle formed by the two airport runways.

3.2.1.3 Climate

The climate in the vicinity of the project site is subtropical with two seasons. The summer period from May through September is generally warm and relatively dry, with predominantly northeast trade winds. In contrast, the winter season from October through April is associated with lower temperatures and higher rainfall, and less prevalent trade winds. Long-term data collected at Līhu'e International Airport indicated that the northeast wind direction prevails throughout the year with a mean annual wind speed of 20 miles an hour. The average daytime maximum temperature ranges from about 78 degrees in the winter to 85 degrees in the summer. Median annual rainfall is about 43 inches.

3.2.1.4 Geology

The island of Kaua'i is geologically one of the oldest and structurally most complex islands in the State of Hawai'i, consisting principally of a large volcano, the Kaua'i Shield Volcano, which became active approximately 4 million years ago. The island's land mass was formed by two major volcanic

series identified as the Waimea Canyon Volcanic Series and the Kōloa Volcanic Series. The Waimea series refers to flows that formed the original volcanic shield and caldera of the island. The Kōloa series refers to subsequent flows that overlaid much of the Waimea series formations on the lower slopes of the island.

The KL property ranges in elevation from about 100 feet above mean sea level (msl) near the center of the site, down to about 40 feet above msl near the shoreline. The property generally slopes towards Runway 17-35 of the Līhuʻe International Airport, and towards the Nāwiliwili Bay and the Pacific Ocean. The U.S. Department of Agriculture, Natural Resources Conservation Service, classifies the soils within the project area as predominantly Līhuʻe gravelly silty clay. These soils developed in material weathered from basic igneous rock. The soil permeability is moderately rapid, runoff is slow, and erosion hazards are not significant.

3.2.2 HYDROLOGY

Five aquifer systems make up the Līhuʻe basin: Kīlauea, Anahola, Wailua, Hanamāʻulu, and Kōloa. The project site is located within the Hanamāʻulu Aquifer system and has a sustainable yield of 40 million gallons per day (CWRM, 2000).

No streams cross the project site. Nāwiliwili Stream is the nearest perennial stream, located southwest of the site.

A network of man-made lagoons encompassing a total of approximately 35 acres provides an attractive resort amenity that will be maintained. The lagoons are approximately 10 feet deep and are supplied by non-potable wells within the property. They are also aerated to help maintain water quality.

Kauaʻi's topography interacts with the winds to produce large variations in conditions from one locality to another. Generally, air blowing inland, as part of the trade wind flow, is redirected horizontally and vertically by the surrounding mountains and valleys. This complex three-dimensional flow of air results in marked differences from place to place in wind speed, cloudiness, and rainfall. Together with variations in the elevation of the land, it results in differences in air temperature.

3.2.3 AIR QUALITY

Air quality on the island is generally good. This is a function of the island's mid-ocean location, the persistent regional winds, and the absence of substantial industry. In 2006, 24-hour PM_{10} (10-micron size particulate matter) concentrations at the single State of Hawaiʻi Department of Health monitoring station in Līhuʻe ranged from a low of 0 microgram per cubic meter to a high of 34 microgram per cubic meter. The average for the entire year was 11 microgram per cubic meter. At no time did the concentration exceed 25% of the 150 microgram per cubic meter State Standard for PM_{10} (State of Hawaiʻi Department of Health 2007).

3.2.4 SOUND LEVELS

The State of Hawaiʻi regulates noise levels through the State of Hawaiʻi Department of Health (DOH) regulations (HAR Title 11, Chapter 46, Community Noise Control). These regulations are also intended to protect public health and welfare, and to prevent significant degradation of the environment and quality of life. As shown in Table 3.1, the chapter establishes maximum permissible sound levels (which are applicable at parcel boundaries) that are dependent on zoning designations and time of day. As the zoning of parcels adjacent to KL covered by the HCP varies, the applicable limits also vary from place to place.

Table 3.1. Maximum Permissible Sound Levels in dBA.

Zoning Districts	Daytime (7AM to 10PM)	Nighttime (10PM to 7AM)
Class A (residential, conservation, preservation, public space, open space)	55	45
Class B (multi-family dwellings, apartment, business, commercial, hotel, resort)	60	50
Class C (agriculture, country, industrial, similar)	70	70
Source: HAR Title 11, Chapter 46, Community Noise Control.		

No ambient sound level measurements were made in the vicinity of the project area during preparation of this report. However, the Final Environmental Assessment for the Kaua'i Lagoons Resort Density Amendment Project (Wilson Okamoto, July 2009) reports that ambient noise in the vicinity is predominantly attributed to aircraft operations at Līhu'e Airport, and to a lesser extent, vehicular traffic along the major roadways.

In 1989, the Airports Division of the State of Hawai'i Department of Transportation completed Noise Exposure Maps for the airport as part of its noise compatibility planning program. These were completed in accordance with the guidelines contained in the Federal Aviation Regulations (FAR) Part 150 Noise Compatibility Planning Program for airports. Based on the official Calendar Year 1991 noise contours established by the FAR Part 150 study, the area covered by the HCP is located in areas that are exposed to noise levels of 55 Ldn or higher.

3.3 EXISTING BIOLOGICAL ENVIRONMENT

3.3.1 FLORA

A botanical survey of the project site was conducted in September-October 2005. The survey report (David, 2005) observes that much of the resort property was previously developed for golf course use, with other areas including landscaped resort vegetation, overgrown pasture, and a tree nursery. The golf courses are dominated by alien turf grasses and various ornamental landscape plants including numerous fig trees (*Ficus sp.*), silk oak (*Grevillearobusta*), ironwood (*Casuarina equisetifolia*), African tulip (*Spathodea campanulata*), coconut (*Cocos nucifera*), monkey pod (*Samanea saman*), *hau* (*Hibiscus tiliaceus*), Royal Poinciana (*Delonix regia*), Manila palm (*Veitchia merrillii*), sago palm (*Cycas sp.*), plumeria (*Plumeria sp.*), bougainvillea (*Bougainvillea sp.*), and various ornamental palms. There is very little ground cover other than turf grass, though the more common ruderal weedy species are present in the areas between some of the paved cart paths and the vegetation separating the golf courses from the resort areas.

The areas between the golf courses and the Kauai Marriott Resort and Beach Club buildings are heavily landscaped and well maintained. All of the species within the golf course areas were also seen in these areas, along with many species more commonly used in resort and residential landscaping, including several species of heliconia (*Heliconia sp.*), white ginger (*Hedychium cornorarium*), yellow ginger (*Hedychium flavescens*), kahili ginger (*Hedychium gardnerianum*), Cook pine (*Arauaria columnaris*), Octopus tree (*Sheffeiera actinophylla*), mango (*Mangifera indica*), banana (*Musa x paradisiacal*), avocado (*Persea americana*), papaya (*Carica papaya*), mock orange (*Philadelphus sp.*), croton (*Codiaeum sp.*), spider lilly (*Hymenocallis sp.*), yellow oleander (*Cascabela thevetia*), *naupaka* (*Scaevola sericea*), and several large areas of wedelia (*Sphagneticola trilobata*). Within the less frequently tended area between the old brew pub and the ocean, the dominant vegetation is Guinea grass (*Panicum maximum*).

3.3.2 FAUNA – OVERVIEW

A faunal survey of the project site was conducted in September-October 2005 (David, 2005). The survey revealed that avian diversity was relatively low, though densities recorded for several species were high. Four species, the House Finch (*Carpodacus mexicanus frontalis*), Japanese White-eye (*Zosterops japonicus*), Western Meadowlark (*Sturnella neglecta*), and Chestnut Munia (*Lonchura atricapilla*) accounted for slightly more than 55% of the total number of all birds recorded during station counts. The most common avian species recorded was the House Finch, which accounted for 23% of the total number of individual birds recorded.

Seven native avian species were detected during the course of the 2005 survey. Five of these species are listed as threatened or endangered under the ESA and Chapter 195D:

- Nēnē (*Branta sandvicensis*),
- Hawaiian Duck (*Anas wyvilliana*),
- Hawaiian Common Moorhen (*Gallinula chloropus sandvicensis*)
- Hawaiian Coot (*Fulica alai*), and
- Hawaiian Stilt (*Himantopus mexicanus knudensi*).

Each of these species is discussed in further detail in Section 3.3.3 below. The other two native species recorded were the Black-crowned Night-Heron (*Nycticorax nycticoraxhactli*), a common resident indigenous heron, and Pacific Golden-Plover (*Pluvalis fulva*), an indigenous migratory shorebird species that nests in the high Arctic, returning to Hawai'i and the tropical pacific during the winter months. Both of these species are federally protected under the Migratory Bird Treaty Act (MBTA).

Although not recorded during the survey, it is likely that the Hawaiian endemic sub-species of the near cosmopolitan Short-eared Owl (*Asio flammeus sandwichensis*) forages over the project site at times, as they are regularly seen within the open lowland areas on Kaua'i and over the Līhu'e Airport grounds.

Other species also not detected during this survey, but documented flying near the project site as they transit between their ocean feeding grounds and their inland nesting colonies are three species of seabird listed under the ESA and/or Chapter 195D: Hawaiian Petrel, Newell's Shearwater, and Band-rumped Storm-Petrels. Each of these species is also discussed in further detail below as a covered species.

With respect to mammalian species, none were encountered during the 2005 survey. Although Hawaiian hoary bats were not observed during the study, they are a ubiquitous species in the lowlands of Kaua'i (R. David, pers. comm. 2010a). However, during predator trapping efforts conducted during the 2008-2009 Nēnē breeding season, cats (*Felis catus*), dogs (*Canis f. familiaris*), and numerous roof rats (*Rattus r. rattus*), and European house mice (*Mus musculus domesticus*) were captured.

3.3.3 COVERED SPECIES

As noted in Section 1.2, each of the species discussed in detail below are considered to be "Covered Species" for purposes of this EA, and the HCP. The following discussions for each species include: (*i*) a description of their ecology and population biology; (*ii*) their distribution, range, and abundance; (*iii*) known current threats to their survival; and (*iv*) their status on the KL property.

3.3.3.1 Nēnē

Taxonomy and Species Description: The Nēnē is a medium-sized goose, with an overall length of approximately 63 to 69 centimeters, or 25-27 inches. This species is adapted to a terrestrial and largely non-migratory lifestyle in the Hawaiian Islands with limited freshwater habitat. Compared to the related Canada Goose (*Branta canadensis*), Nēnē wings are reduced by about 16% in size and their flight is weak. Nonetheless, Nēnē are capable of both interisland and high altitude flight (Banko et al. 1999:9).

Historic and Current Distribution: Fossil evidence shows that Nēnē were found on all the main Hawaiian Islands. It is believed that they were abundant (about 25,000 birds) on the Big Island before the arrival of Captain James Cook in 1778 (USFWS 2004, p. 24). Currently there are wild populations on the islands of Hawai'i, Maui, Moloka'i and Kaua'i with an estimated 457, 416, 165, and 850-900 individuals, respectively as of 2009 (A. Marshall 2010, pers. comm.). After narrowly avoiding extinction in the 1940s and 1950s, Nēnē populations have been slowly rebuilt through captive-breeding programs. As a result of such programs, Nēnē have been reintroduced onto four of the main Hawaiian Islands (Kauai, Maui, Moloka'i, and Hawai'i). There are currently four population centers on Kaua'i, each resulting from releases of captive-bred birds. Approximately 25 captive Nēnē were released by Kipu Kai Ranch in 1985 on the southeast coastline of Kaua'i. Another 38 captive bred Nēnē have been released by the Kilauea Point National Wildlife Refuge since 1991. A third population was initiated on the Na Pali Coast of northwestern Kaua'i with the release of 62 captive Nēnē from 1995 to 1996. Twenty-four Nēnē were introduced to the Hanalei National Wildlife Refuge in April 2000 (USFWS 2004, p. 17-18; Nēnē Recovery Action Group 2007, pers. comm.).

Life History: The Nēnē has an extended breeding season with eggs reported from all months except May, June, and July, although the majority of birds in the wild nest during the rainy (winter) season between October and March (Banko et al. 1999, p. 4). Nesting peaks in December and most goslings hatch from December to January (Banko et al. 1999). Nēnē typically nest on the ground, in a shallow scrape in the dense shade of a shrub or other vegetation. A clutch typically contains three to five eggs, and incubation lasts for 29 to 31 days. While the female incubates the eggs, the male stands guard nearby, often from an elevated location in an effort to protect the vulnerable egg(s) from predation by alien mammalian species. Once hatched, the young remain in the nest for one or two days, (Banko et al. 1999, p. 16-17). Fledging of captive birds occurs at 10 to 12 weeks, but may occur later in wild birds. During molt, adults are flightless for a period of 4 to 6 weeks, generally attaining the flight feathers at about the same time as their offspring. When flightless, goslings and adults are extremely vulnerable to predators such as dogs, cats, and mongooses. From June to September, family groups join other in post-breeding aggregations (flocks), often far from nesting areas.

Habitat Description: The current distribution of Nēnē has been highly influenced by the location of release sites for captive-bred Nēnē. Nēnē are known to occupy various habitat and vegetation community types ranging from coastal dune vegetation and non-native grasslands (such as golf courses, pastures, and rural areas) to sparsely vegetated low- and high-elevation lava flows, mid-elevation native and non-native shrubland, cinder deserts, native alpine grasslands and shrublands, open and nonnative alpine shrubland-woodland community interfaces (Banko et al. 1999, p. 4-6). Nēnē are browsing grazers. The composition of their diet depends largely on the vegetative

composition of their surrounding habitats and they appear to be opportunistic in their choice of food plant as long as they meet nutritional demands (Banko et al. 1999, p. 6-8; Woog and Black 2001, p. 324). Nēnē may exhibit seasonal movements to grasslands in periods of low berry production and wet conditions that produce grass with higher water content and resulting higher protein content. The distribution of Nēnē nests generally has also been associated with the location of release sites of captive-bred Nēnē since 1960. The sites used by Nēnē for nesting range from coastal lowland to subalpine zones and demonstrate considerable variability in physiognomic features (Banko et al., 1999, p. 4-5). Nest sites studied at Haleakalā National Park were located in well-vegetated habitat. During the breeding season, Nēnē were observed feeding mainly on berries and other plant items found near their nest sites. Although some birds supplemented their diets by feeding in grasslands due to declining berry density, their principal foods are cultivated grasses during the pre- and non-breeding season (Black et al. 1994, pp. 65-109).

Threats: The Nēnē was listed as endangered in 1967 (USFWS, 1967, p. 4001). The *Nēnē Recovery Plan* was first written in 1983. A *Draft Revised Recovery Plan for the Nēnē or Hawaiian Goose* was recently published and incorporated a considerable amount of new information in the field of genetics, paleontology, nutrition, behavior, effects of predation, and predator control. The plan also recommended a shift in recovery efforts to include more intensive habitat management and releases of captive-reared birds at lower elevations (USFWS 2004, p. 3). The main limiting factors currently affecting Nēnē recovery are predation by introduced mammals, insufficient nutritional resource for both breeding females and goslings, limited availability of suitable habitat, and human-caused disturbance and mortality (USFWS 2004, p. iii). In order for Nēnē populations to survive, they must be provided with relatively predator-free breeding areas and sufficient food resources. At the same time, human-caused disturbance and mortality must be minimized, and genetic and behavioral diversity maximized. It is also recognized that Nēnē are highly adaptable, successfully utilizing a gradient of habitats, ranging from highly altered to completely natural, which bodes well for the recovery of the species. The USFWS's *Draft Revised Recovery Plan* proposes utilizing a mix of natural and human-altered habitats in such a way that meets the life history needs of the species and promotes self-sustaining populations at or above recovery target levels (USFWS 2004, pp. iv-vi).

Nēnē at Kaua'i Lagoons: Nēnē have been present at the Kaua'i Lagoons property since the late 1990s. Prior to Kaua'i Lagoons instituting its own monitoring program at the resort, biologists banded and monitored birds at the facility from 1999 until 2007. In the ensuing 10 years the population and nesting activity on the property substantially increased. In 1999, the first year for which complete records are available, five nests were recorded on the property (see Table 3.2), and they produced 8 goslings.[8] Eleven years later, 66 nests were documented, which produced 103 goslings that fledged.

[8] The level of DOFAW's monitoring effort from 1999-2007 is unknown.

Table 3.2 Nēnē Nesting at Kaua'i Lagoons 1999-2009

Year	*Nests*	*Eggs Laid*	*Eggs Hatched*	*Goslings*[9]	*Moved by DOFAW*
1999	5	11	11	8	
2000	6	-	-	4	
2001	13	-	-	23	
2002	9	-	-	5	
2003	16	-	-	34	
2004	26	74	-	63	
2005	22	-	-	57	41 goslings
2006	44	130	-	90	53 goslings
2007	40	124	-	92	56 goslings
2008	57	181	131	82	29 goslings+12 adults
2009	66	206	144	103	none
Source: 1999-2007 DOFAW unpublished data; 2008-2009, Kaua'i Lagoons & DOFAW unpublished data.					

Nēnē at the KL site have shown remarkable flexibility and adaptiveness in their nest site selection and in their ability to rapidly utilize emerging nesting habitat and resources (David and Silva, 2008). The phenomenon is best illustrated by nesting activity in and around what used to be the 15th hole of the Kiele golf course, just east of the lagoon. During the 2004-2005 season, two nests were found in the rough along this golf hole, and in 2005-2006 three nests were found in the same general area. Prior to the start of the next nesting season, Kaua'i Lagoons cleared the *koa haole* forest between fairway number 15 and Fashion Landing (see Figure 2.1). Nēnē immediately moved into this newly available nesting habitat during the 2007-2008 nesting season. Then, as part of the resort development project, KL cleared all vegetation from this same area prior to the 2008-2009 season, rendering it no longer suitable for nesting. Nevertheless, all 15 Nēnē pairs from the prior season nested successfully at other locations on the resort property; indeed one pair double-clutched, raising goslings from the first clutch while sitting on eggs from the second clutch (see Table 3.3).

During the 2009-2010 nesting season all 13 surviving pairs again nested on the resort property. As discussed below, in 2009 one or both members of two of these 15 pairs (pair oIP♂+gJZ♀ and male gZU) died in captivity at the Hulē'ia National Wildlife Refuge. We assume that the companion to gZU (female gZS) is still at the refuge, as DOFAW previously clipped the wings of the translocated birds to render them flightless.

The population of Nēnē on the KL property varies on a seasonal basis. The lowest counts over the past four years have been on the order of 25 birds, and these are typically recorded between May and July. The highest numbers have exceeded 255-260 birds (R. David, pers. comm. 2010b); these peak numbers usually are present between December and February. Table 3.4 illustrates the growth of the Nēnē population on the property over the past 11 years.

[9] Goslings are defined as birds that survived to fledging (i.e. are able to fly).

Table 3.3 Mass Grading Area Nēnē Nesting Pairs 2007-2010

Nest #	*Pair 2007-2008*	*Nest #*	*Pair 2008-2009*	*Nest #*	*Pair 2009-2010*
6	oIP♂ + gJZ♀	13	oIP♂ + gJZ♀		Both died Huleia
7	b191♂ + y097♀	9	b191♂ + y097♀	5	b191♂ + y097♀
8	gYY♂ + yTN♀	2	gYY♂ + yTN♀	9	gYY♂ + yTN♀
14	bFD♂ + oIV♀	8	bFD♂ + oIV♀	44*	r505 + oIV♀
15	gUF♂ + gJX♀	42*	y123♂ + gJX♀	49	y123♂ + gJX♀
17	gYX♂ + rSJ♀	7	gYX♂ + rSJ♀	32	gYX♂ + rSJ♀
23	gLF♂ + gJS♀	12	gLF♂ + gJS♀	36	gLF♂ + gJS♀
25	y742♂ + gVH♀	56	y742♂ + gVH♀	46	y742♂ + gVH♀
26	y112♂ + gXI♀	27	y112♂ + gXI♀	30	y112♂+ gXI♀
27	gZU♂ + gZS♀	43	gZU♂ + gZS♀		gZU Died Huleia
31*	bPX♂ + rSF♀	51*	bPX♂ + rSF♀	61*	bPX♂ + rSF♀
33	bTS♂ + gVB♀	17	bTS♂ + gVB♀	3	bTS♂ + gVB♀
34	gYP♂ + gUV♀	11	gYP♂ + gUV♀	39	gYP♂ + gUV♀
37	gUY♂ + gUX♀	14	gUY♂ + gUX♀	14*	y170♂ + gUX♀
40	y099♂ + gUI ♀	33	y099♂ + gUI ♀	48	y099♂ + gUI ♀

Notes:
1. Nest 42 — during the 2008-2009 season female paired with a new male.
2. Nest 44 — during the 2009-2010 season male bFD re-banded as r505.
3. Nest 14 — during the 2009-2010 season female paired with new male.
4. Female bPX was re-banded r506 during the 2008-2009 season.

Table 3.4 Approximate Numbers of Nēnē on the Resort Property 1999-2009

Year	***Nests***	***Goslings***	***Adults***	***Total Nēnē***
1999	5	8	10	18
2000	6	4	12	16
2001	13	23	26	49
2002	9	5	18	23
2003	16	34	32	66
2004	26	63	52	115
2005	22	57	44	101
2006	44	90	88	178
2007	40	92	80	172
2008	57	82	114	196
2009	66	103	150-169	253-272
Source: 1999-2007 DOFAW unpublished data, 2008-2009, Kaua'i Lagoons and DOFAW unpublished data.				

Captive bred Nēnē raised in England and various facilities in Hawai'i have been reintroduced onto Hawai'i, Maui, Moloka'i, and Kaua'i. Between 1960 and 2003, a total of 2,643 captive-bred Nēnē were released statewide (USFWS 2004).

As previously mentioned, DOFAW has also translocated Nēnē (both adults and goslings) and eggs from the resort property to other locations annually since the 2005-2006 nesting season. In 2005 DOFAW translocated 8 eggs from Kaua'i Lagoons to Maui, and an additional 3 eggs in 2006; all 11 eggs hatched successfully. In 2006, 2007, and 2008, DOFAW translocated 41, 53, and 56 goslings respectively from the resort property to other sites on private lands on Kaua'i. Of the 53 goslings translocated in 2007, six returned to the resort, as did 3 of the 56 goslings translocated in 2008. In both 2007 and 2008 the birds were back at the resort within 10 days of their releases.

In January 2009, KL entered into a Memorandum of Agreement (MOA) with the USFWS, and the USFWS issued a Biological Opinion on the MOA. In the MOA, the USFWS required that KL work with the USFWS and DOFAW to facilitate the agencies' development of a protocol for translocating up to 14 Nēnē family groups (i.e., adults and their goslings) from the resort to other locations on Kaua'i, and that the agencies implement such protocol. The USFWS then took the lead in developing the protocol and associated budget, and making arrangements for six Nēnē family groups to be translocated to the nearby Hulē'ia National Wildlife Refuge in Spring 2009. USFWS arranged for DOFAW to capture these Nēnē families (consisting of a total of 12 adults and 20 goslings) at the resort and transfer them to Hulē'ia, where they were placed into fenced pens[10]. During the ensuing period of captivity, DOFAW staff clipped the wings of the adults to render them flightless. One translocated gosling and five of the twelve translocated adults died in captivity. The U.S. Geological Survey, Biological Resources Division (USGS-BRD), performed a necropsy on the deceased gosling and determined that it had died of toxoplasmosis. The first adult mortality was discovered on June 22, 2009. A USGS-BRD necropsy determined that this adult died of "uncomplicated emaciation" due to a failure to receive proper nutrition. Three additional deceased adults were discovered on July 4, and one additional deceased adult was discovered on July 5. USGS-BRD later determined that these birds likewise died of emaciation. The remaining birds were released from the holding pens shortly thereafter, and USFWS has arranged to monitor their condition.

3.3.3.2 Hawaiian Stilt

Taxonomy and Species Description: The Hawaiian Stilt (*Himantopus mexicanus knudensi*) is part of a cosmopolitan superspecies complex including the Black-necked Stilt (*Himantopus mexicanus*) of North and South America, the Black-winged Stilt (*H. himantopus*) of Eurasia and Africa, and Pied Stilt (*H. leucocephalus*) and Black Stilt (*H. novazilandiae*) from Australasia (Robinson et al. 1999). The Hawaiian endemic race of the Black-necked Stilt is considered a distinct subspecies of the Black-necked Stilt (AOU 1998). Colonization of Hawai'i by stilts probably resulted from North American vagrants. The stilt is a slender wading bird, with black above (except for the forehead) and white below, with distinctive long pink legs. The Hawaiian Stilt differs from the North American Black-necked Stilts by having black extending lower on the forehead as well as around to the sides of the neck, and by having a longer bill, tarsus (lower leg), and tail (Coleman 1981; Robinson et al. 1999).

[10] DOFAW also separately translocated 9 goslings from the resort to Grove Farm property.

Historic and Current Distribution: Hawaiian Stilts were historically known from all of the major islands except Lāna‘i and Kaho‘olawe (Paton and Scot 1985). As with the other Hawaiian waterbirds, there are no estimates of historical numbers. However, extensive wetlands and aquatic agricultural lands historically provided a fair amount of habitat. Loss of this habitat undoubtedly caused a decrease in stilt numbers. It has been suggested that the population had declined to approximately 200 birds by the early 1940’s (Munro 1960). This number, however, may have been an underestimate of the population, as other estimates from the late 1940s place the population at approximately 1,000 birds (Schwarz and Schwarz 1949). Hawaiian Stilts are currently found on all the main Hawaiian Islands except Kaho‘olawe. Based on biannual Hawaiian waterbird surveys from 1998 through 2003 (2002 was excluded because of missing data), the stilt population averaged 1,350 birds, but fluctuated between 1,200 and 1,500 birds (HDLNR 1976-2003).

Long-term census data indicate statewide populations have been relatively stable or slightly increasing for the last 30 years (Reed and Oring 1993). Hawaiian Stilts readily disperse between various islands. For example, considerable movement occurs between Kaua‘i and Ni‘ihau, apparently in response to rainfall patterns and the flooding and drying of Ni‘ihau’s ephemeral lakes (Engilis and Pratt 1993). On Kaua‘i, stilts are numerous in large river valleys such as Hanalei, Wailua, and Lumaha‘i. Stilts also frequent Kaua‘i's reservoirs, particularly during drawdown periods, as well as sugarcane effluent ponds in Līhu‘e and Waimea. Between 1998 and 2003 (excluding 2002 because of missing data), the stilt population on Kaua‘i has fluctuated between approximately 125 to 350 birds (HDLNR 1976-2003).

Life History: Hawaiian Stilts prefer to nest on freshly exposed mudflats interspersed with low growing vegetation cover. The nest itself is a simple scrape on the ground. They have also been observed using grass stems and rocks for nesting material (Coleman 1981; M. Morin, pers. comm. 1994). Nesting also occurs on islands (natural or manmade) in fresh or brackish ponds (Shallenberger 1977). Stilts are territorial and maintain an area approximately 14 to 30 meters (46 to 98 feet) around nests (Robinson et al. 1999). The nesting season normally extends from mid-February through August, but varies among years, perhaps depending on water levels. Stilts usually lay 3 to 4 eggs that are incubated for approximately 24 days (Coleman 1981; Chang 1990). Because of their exposed nest sites, stilts appear to be more susceptible to avian predators than other Hawaiian waterbirds. Stilts are opportunistic feeders. They eat a wide variety of invertebrates and other aquatic organisms as available in shallow water and mudflats. Feeding typically occurs in shallow flooded wetlands. These types of wetlands are ephemeral in nature and may appear at any time of year, but are primarily available in winter. Hawaiian Stilts require specific conditions (water depths of 13 centimeters [5 inches] or less) for optimal foraging (Telfer 1973). Thus, intra- and inter-island movement is an important strategy for exploiting food resources and has been documented between O‘ahu and Maui by statewide waterbird survey data and banding studies (Ueoka 1979; Engilis and Pratt 1993; Reed et al. 1994; Reed et al. 1998).

Habitat Description: Hawaiian Stilts use a variety of aquatic habitats but are limited by water depth and vegetation cover. Stilts require early successional marshlands with water depth less than 24 centimeters (9 inches) and favor perennial vegetation that is limited and low growing such as nonnative pickleweed (*Batis maritima*), California grass, and seashore paspalum or knotgrass (Paspalum spp.), or exposed tidal flats. Native low-growing wetland plants associated with stilt nesting areas include *‘ae‘ae* (*Pacopa monnieri*), *‘akuli‘kuli* (*Sesuvium portulacastrum*), and the sedges *makaloa* (*Cyperus laevigatus*) and *kaluha* (*Bolboschoenus maritimus*) (Robinson et al. 1999).Stilts may also use taro ponds where the full grown vegetation forms a protective canopy. Stilts are rarely found in wetlands above 200 meters (660 feet) elevation. Stilts generally forage and nest in different wetland sites, moving between these areas daily. Adults with three-day-old chicks have been observed to move 0.5 kilometer (0.3 mile) from the nest site (Reed and Oring 1993). Nesting sites are adjacent to or on low-relief islands within bodies of fresh, brackish, or salt water. These include irrigation reservoirs and settling basins, natural or manmade ponds, marshes, taro

ponds, silted ancient fishponds, salt evaporation pans, and other wetlands. Feeding habitat consists of shallow water that is fresh, brackish, or saline. Freshwater sites include irrigation ditches, reservoirs, settling basins, taro patches, sewage ponds, and marshes. Brackish-water feeding habitats consist of coastal ponds, fishponds, and estuaries. Saltwater feeding habitat includes inshore reefs, beach areas, and tidal flats. Loafing areas include open mudflats, pickleweed flats, and pasture lands where visibility is good and predator populations are low.

Threats: Threats to the Hawaiian Stilt are similar to those faced by Nēnē. The primary threat to this species has been the conversion of wetland habitat. Twenty years ago it was estimated that there had been a 31% reduction in wetlands located in the coastal plains in the Hawaiian Islands; that reduction has continued in the ensuing 20 years due to wetland based agricultural ventures and sugar cane production being greatly reduced or ceasing operations (Dahl 1990). Introduced mammalian predators also pose a significant threat to stilts as stilts nest on the ground, and thus their nests are readily accessible by cats, dogs, and rodents.

Hawaiian Stilt at Kaua'i Lagoons: Due to the lack of suitable foraging and nesting habitat, KL property is used infrequently by the species (see the description of foraging and nesting preferences provided above). Over the past two years, between one and three pairs of stilts have been documented on the site. In both years one pair successfully nested in an abandoned golf course sand trap. During the 2008-2009 nesting season the one pair that nested produced four chicks, which all successfully fledged. The location in which this pair nested was created during the remodeling of the golf course. This habitat will not be available to the birds over the next two years, as the currently abandoned sand trap will once again be filled with sand and be part of an active golf hole in 2012; this would occur only after ensuring that the site is not currently an active site for breeding stilts. Stilt have not usually been observed in areas that place them at risk from golf play.

3.3.3.3 Hawaiian Coot

Taxonomy and Species Description: The Hawaiian Coot (*Fulica alai*) is endemic to the Hawaiian Islands. In the past the Hawaiian Coot was considered a subspecies of the American Coot (*Fulica americana*) and was originally listed under the Endangered Species Act as such, but it is now regarded as a distinct species (AOU 1993). The Hawaiian Coot is non-migratory and presumably originated from stray migrants from continental North America that remained as residents of the islands (Brisbin et al. 2002). The Hawaiian Coot is smaller in body size than the American Coot; the bulbous frontal shield above the bill is distinctly larger than that of the American Coot and is usually completely white (Shallenberger 1977; Pratt et al. 1987).A small percentage of the Hawaiian Coot population has a red lobe at the top of the frontal shield and deep maroon marking at the tip of the bill, similar to the American Coot (Pratt et al. 1987). Adult coots are dark, slate-gray in color, with white undertail feathers. Male and female coots are similar in color. Coots have large feet with lobed toes, unlike the webbed feet of ducks. Immature coots are a lighter gray with buff-tipped contour feathers, smaller, dull white bill, and lack a well-developed frontal shield. Downy chicks have red skin and a bill with a yellow tip, similar to that of the American Coot (Brisbin et al. 2002).

Historical and Current Distribution: Hawaiian Coots historically occurred on all the main Hawaiian Islands except Lāna'i and Kaho'olawe, which lacked suitable wetland habitat. Coots have always been most numerous on O'ahu, Maui, and Kaua'i (Shallenberger 1977). It is likely that they were

once fairly common in large natural marshes and ponds and used wetland habitats created by Hawaiians for taro cultivation and large-scale fish production. No population estimates are available prior to the 1950s, however Schwarz and Schwarz (1949) identified a decline and potential threat of extinction in the first half of this century. Census from the late 1950s to the late 1960s indicated a population of fewer than 1,000 birds, contributing to the Federal listing of the Hawaiian Coot as endangered in 1978 (USFWS 1978). Hawaiian Coots currently inhabit all of the main Hawaiian Islands except for Kaho‘olawe. Based on winter counts from biannual waterbird surveys from 1998 to 2003 (2002 was excluded because of missing data), the coot population averaged 2,100 birds and fluctuated between 1,500 and 3,000 birds (HDLNR 1976-2003). As coots are conspicuous and often use open water areas, they are relatively easy to census, so these data are considered fairly accurate minimum population estimates. Survey data from 1976 through 2003 reveal short-term population fluctuations, with a long-term slightly increasing population trend overall. Not all wetlands are surveyed, but the number of Hawaiian coots counted during biannual waterbirds surveys has been below 1,500 for winter counts from 2005 to 2007 and below 2,000 for summer counts from 2001 to 2006, with Kaua‘i, O‘ahu, and Maui supporting 80% of these birds (HDOFAW 1976-2007). Engilis and Pratt (1993) reported the statewide Hawaiian coot population to range from 2,000 to 4,000 birds. Coots are known to disperse readily and exploit seasonally flooded wetlands, and their population will naturally fluctuate according to climatic and hydrologic conditions (Engilis and Pratt 1993). During the 1998 to 2003 census period (excluding 2002 due to missing data), the coot population on Kaua‘i fluctuated between 300 and 1,500 birds (HDLNR 1976-2003). Some of this variation is due to dispersal of coots to Ni‘ihau in wet years. Several authors have speculated that annual migration occurs between Kaua‘i and Ni‘ihau, but statewide surveys indicate that these movements are less frequent, usually occurring when annual precipitation is above normal and Ni‘ihau’s ephemeral lakes become flooded (Engilis and Pratt 1993).

Life History: Hawaiian Coots nest on open fresh water and brackish ponds, taro ponds, shallow reservoirs, irrigation ditches, and in small openings of marsh vegetation (Udvardy 1960; Shallenberger 1977). They construct floating nests of aquatic vegetation on open water, or semi-floating nests anchored to emergent vegetation or in clumps of wetlands vegetation (Byrd et al. 1985). Open-water nests are typically anchored on semi-floating mats of vegetation, usually constructed from water hyssop (*Bacopa monnieri*) and Hilo grass (*Paspalum conjugatum*). Nests in emergent vegetation are platforms constructed from buoyant stems of nearby vegetation, such as brush (*Scirpus spp.*) (Byrd et al. 1985).Nesting occurs primarily from March through September, although some nesting occurs in all months of the year (Shallenberger 1977). Clutch size ranges from 3 to 10 eggs, with an average of 5 eggs (Byrd et al. 1985). The incubation period is about 25 days (Shallenberger 1977; Byrd et al. 1985),and chicks are able to swim as soon as their down has dried (Brisbin et al. 2002). Coots are generalist feeders, obtaining food near the surface of the water, diving, or foraging in mud and sand. They also graze on upland grassy sites such as golf courses that are adjacent to wetlands, especially during times of drought when food is unavailable elsewhere (T. Telfer, pers. comm. 1999). Food items include seeds and leaves of aquatic plants, various invertebrates including snails, crustaceans, and aquatic or terrestrial insects, tadpoles, and small fish (Schwarz and Schwarz 1949). Coots typically feed close to their nesting areas but will travel long distances when food is not locally available (Shallenberger 1977). Intra-islands movements occur when water levels are low and food sources become concentrated. Statewide waterbird surveys from 1977 to 1986 indicate that coots migrate between islands in response to precipitation patterns. Periodic increases in coot numbers on Ni‘ihau and Moloka‘i presumably are the result of movement of birds from Kaua‘i and Maui, respectively (Engilis and Pratt 1993).Population increases on Ni‘ihau are correlated with the intermittent availability of wetlands resulting from high rainfall.

Habitat Description: The Hawaiian Coot is typically a species of the coastal plain usually found below 400 meters (1,320 feet) elevation, and preferring wetland habitats with suitable emergent plant growth interspersed with open water. Hawaiian Coots prefer freshwater wetlands, but will use brackish wetlands, and rarely, saline habitats. Coots forage in water less than 30 centimeters (12

inches)deep, but can dive in water up to 120 centimeters (48 inches) deep. They prefer more open water than do moorhens, particularly for feeding. Optimum nesting habitat for the American Coot (*Fulica americana*) is generally in a 50:50 to 75:25 mix of dense emergent vegetation and open water. Hawaiian Coots may prefer a similar mix but research on nesting habitat is limited. Large, deep ponds appear to provide only limited habitat for coots, particularly in areas where strong winds can cause the formation of wavelets. Loafing sites include logs, rafts of vegetation, narrow dikes, mud bars, artificial islands, and "false nests". Coots also nest on open bodies of water such as reservoirs. Because of their ability to disperse to find suitable foraging habitat, ephemeral wetlands play an important part in their annual life cycle.

Threats: Primary threats to Hawaiian Coots, similar to those described for other waterbird species in the Hawaiian Islands, are habitat loss, alien mammalian predators, pathogens, and interactions with human activities.

Hawaiian Coots at Kauaʻi Lagoons: Hawaiian Coots have never been documented nesting on KL property except during the 2008-2009 season - a pair of coots with a single chick was observed in the resort lagoons. The number of birds present on the property varies on a seasonal and annual basis, likely due to precipitation (Engilis and Pratt 1993). In the past twenty years, numbers have varied between fewer than a dozen birds to upwards of 350 birds (Alan Silva, pers. comm., KL unpublished data). During the 2008-2009 Nēnē nesting season KL documented a range of 2 and 84 coots on the property. The low numbers recorded likely represent an inverse relationship to the amount of rain that fell on Kauaʻi and Niʻihau at the end of the year—December rainfall recorded at Līhuʻe Airport was 407% above average (Pacific ENSO Applications Climate Center 2009). Hawaiian Coots loaf and forage on a number of the golf course holes, and are also regularly seen swimming in all lakes, ponds, and water features within the resort property. When present on the golf course, Hawaiian Coots tend to congregate on golf hole numbers *Kiele* 17 and 18, with smaller numbers seen on a regular basis on *Mokihana*hole number 13. At times when coot numbers are high, they are potentially at risk from golf play.

3.3.3.4 Hawaiian Moorhen

Taxonomy and Species Description: The Hawaiian Moorhen (*Gallinula chloropus sandvicensis*) is an endemic subspecies of the Common Moorhen (*Gallinula chloropus*) (AOU 1998). The Hawaiian sub-species is non-migratory and presumably originated from stray migrant birds that colonized Hawaiʻi from North America (Nagata 1983). Although the Hawaiian sub-species is recognized as distinct from its North and South American relatives, there are no evident plumage, soft body coloration, or measurement differences from forms in North America (Wilson and Evans 1890 to 1899; Rothschild 1900). Hawaiian Moorhens superficially resemble the closely related continental Common Moorhens, but they are noticeably smaller, possess a red shield over their red and yellow bill, and have a white flank stripe (Schwarz and Schwarz 1949; Bannor and Kiviat 2002). They are black above and slate blue below, with underwing coverts mostly white. Their legs and feet are yellowish green, and the feet are not lobed, as in the coot.

Historic and Current Distribution: The Hawaiian Moorhen was found on all of the main Hawaiian Islands except Lānaʻi and Kahoʻolawe in 1891 (Munro 1961). However, by the late 1940s their status was considered precarious, especially on Oʻahu, Maui, and Molokaʻi (Schwarz and Schwarz 1949).Moorhens disappeared from Molokai sometime after the 1940s and were reintroduced in 1983,

but the population did not persist and the species is currently not known to occur on the island. Like the continental races of the Common Moorhen, the Hawaiian Moorhen is predominantly a species of the coastal plain, generally found below an elevation of 125 meters (410 feet) elevation. The Hawaiian Moorhen is quite secretive and difficult to census, and even rough population estimates were lacking until the 1950s. As a result, the long-term population trend is difficult to determine. Surveys in the 1950s and 1960s estimated no more than 57 individuals (Engilis and Pratt 1983). The spread of aquaculture on Oʻahu in the late 1970s and 1980s probably led to an increase in the number of moorhens. In some locations, aquaculture projects support some of the highest concentrations of moorhens in the State (Engilis 1988; M. Silbernagle, USFWS pers. comm. 2000) although wetlands managed for moorhens have the potential to support high concentrations as well. Hawaiian Moorhens are currently found on the islands of Oʻahu and Kauaʻi. Biannual waterbird surveys provide a rough idea of recent waterbird trends, but an accurate population estimate is not available due to the secretive nature of this species and its use of densely vegetated wetland areas. Counts of moorhens have been stable, but remain low, with average totals of 314 birds in a recent 5-year period (1998-2001 and 2003) (HDLNR 1976-2003). Hawaiian Moorhens are widely distributed in lowland wetlands and valleys on Kauaʻi. Sizeable populations exist in the Hanalei and Wailua River valleys, Waiakalua Reservoir, and Wilcox Ponds. Dense vegetation around lowland reservoirs may also support moorhens, but nesting is limited by deep water and severe water level fluctuations. Moorhens are also found in wetland agricultural areas such as taro fields.

Life History: Little is known of the Hawaiian Moorhen's breeding biology. Most nests are inconspicuously placed within dense emergent vegetation over shallow water. Moorhens generally nest in areas with standing freshwater less than 60 centimeters (24 inches) deep. The emergent vegetation is folded over into a platform nest (Shallenberger 1977). Where emergent aquatic vegetation is insufficient, nests may be placed on the ground, but most have tall cover nearby. Apparently, the particular species of emergent plant used for nest construction by moorhens is unimportant as long as it is a robust emergent (Weller and Fredrickson 1973). Like other moorhen subspecies, the Hawaiian Moorhen is territorial. Territory size of nesting pairs at Hamakua Marsh on O`ahu ranged from 853 to 2,416 square meters (9,182 to 26,006 square feet) (Smith and Polhemus 2003). Nesting occurs year-round, but most activity extends from March through August and is influenced by water levels and vegetation growth (Shallenberger 1977; Byrd and Zeillemaker 1981; Chang 1990). Clutch size differed among 2 island investigations, where it averaged 4.9 eggs on Kauaʻi (n = 87 nests) (Chang 1990) and 5.6 eggs on Oʻahu (n = 64 nests; Byrd and Zeillemaker 1981). The incubation period ranges from 19 to 22 days (Byrd and Zeillemaker 1981). Moorhens are a precocial species (i.e., chicks are covered with down and are able to walk), but are dependent on the parents for several weeks. Re-nesting and multiple broods during one season have been observed (Byrd and Zeillemaker 1981). Little information is available on the feeding habits of the Hawaiian Moorhen. Food items consumed by this subspecies may include algae, aquatic insects, and mollusks (Schwartz and Schwartz 1949). Telfer (unpubl. data) found remains of snails, guava seeds, algae, and other plant material in stomachs of road-killed moorhens on Kauaʻi. Seeds of grasses, parts of various plants, and other types of invertebrates are probably also included in the moorhen's diet. Hawaiian Moorhens are the most secretive of the native Hawaiian waterbirds, preferring to forage in dense emergent vegetation. Most birds feeding along the edge or in the open quickly seek cover when disturbed. Moorhens are good swimmers and often cross open water to reach foraging sites. They are generally sedentary; however, moorhens readily disperse in spring, presumably to breed (Nagata 1983). Dispersal may occur in relation to dry and wet periods (Engilis and Pratt 1993). Whether the Hawaiian Moorhen is capable of inter-island movement is unknown.

Habitat Description: Hawaiian Moorhen habitat in Hawaii consists of freshwater marshes, taro patches, lotus fields, reedy margins of watercourses (streams, irrigation ditches, etc.), reservoirs, wet pastures, and occasionally saline and brackish water areas. The densest moorhen nest areas are at the Hanalei National Wildlife Refuge and taro fields on the island of Kauaʻi, and at the Kahuku and *ʻUkoʻa* wetlands and Waialua lotus fields on Oʻahu. The key features of habitat areas for moorhens

are: (*i*) dense stands of robust emergent vegetation near open water; (*ii*) floating or barely emergent mats of vegetation; (*iii*) water depth of less than 1 meter (3.3 feet); and (*iv*) fresh water as opposed to brackish or saline water. Interspersion of robust emergent vegetation and open water is important for common moorhens on the mainland, and presumably also for the Hawaiian subspecies. The optimal overall ratio of emergent vegetation to open water is 50:50 (Weller and Fredrickson 1973).

Threats: Threats to this species are similar to those described for the other waterbirds that are covered by the HCP and this EA.

Hawaiian Moorhen at Kaua'i Lagoons: Hawaiian Moorhen are relatively abundant on the resort property. Determining exactly how many birds use resources on the property is challenging due to their innate secrecy. High numbers on the property have approached approximately 50 birds. This species nests on the property in small numbers. It has been estimated that there may be up to 10 nests a year on the property (Alan P. Silva, pers. comm. 2010). During the 2008-2009 season, KL recorded four separate Hawaiian Moorhen pairs with young chicks. One nest was found in an abandoned golf course bunker, close to the lagoon on hole 18. This pair successfully hatched out five chicks, losing one to predation by a Cattle Egret (*Bulbucus ibis*), an event that one of the KL biological monitors was able to document photographically. Moorhen are typically found on the western side of the resort property. They are often seen in or close to the main lagoon, the boat dock lagoon and irrigation pond located on the northwest corner of the site. They have also been recorded nesting in the nursery, which is located in the triangular parcel between the runways. They tend to nest adjacent to the more remote ponds on the site that have dense shoreline vegetation such as the irrigation pond. They do not nest in the water features within the golf course proper. Additionally, they are seldom seen on golf holes themselves, so that they are not often potentially at risk from golf play.

3.3.3.5 Hawaiian Duck

Taxonomy and Species Distribution: The Hawaiian Duck (*Anas wyvilliana*) was first described in 1851. At the time, it was considered to be a species or possibly a subspecies of the Mallard (*Anas platyrhynchos*). However, more recent genetic studies indicate that the Hawaiian Duck is distinct at the species level and is closely related to the Mallard (AOU 1983; Browne et al. 1993). Allozyme[11] data indicate there has been extensive hybridization between Hawaiian Ducks and feral Mallards on O'ahu, with the near disappearance of Hawaiian Duck alleles from the population on that island (Browne et al. 1993). The Hawaiian Duck is a small (mean weight of males 604 grams [19 ounces], females 460 grams [15 ounces], drab brown duck (Griffin and Browne 1990). Both sexes are mottled brown and similar in appearance to a female mallard. Pure Hawaiian Ducks appear to be significantly more common on Kaua'i than on the other islands (Fowler et al. 2008).

Historic and Current Distribution: Hawaiian Ducks were known historically from all the main Hawaiian Islands except Kaho'olawe and Lāna'i. There are no population estimates prior to 1940, but in the 1800s they were fairly common in natural and farmed wetland habitats (Engilis et al. 2002). The arrival of the Polynesian people in Hawaii about 1,600 years ago (Kirch 1982) and their cultivation of taro (*Colocasiae sculenta*), an agricultural crop grown in a pond-like environment,

[11]Variant forms of an enzyme that are coded by different alleles at the same locus are called allozymes. These are opposed to isozymes, which are enzymes that perform the same function, but which are coded by genes located at different loci.

considerable increased the amount of wetland habitat in the islands (Swedberg 1967). Rice (*Oryza sativa*) cultivation from the late 1800s to the 1940s continued to provide wetland habitat for the Hawaiian Duck. A variety of factors, including predation of eggs and chicks by rats, small Indian mongooses, domestic dogs, domestic cats, introduced fish and birds, habitat reduction due to changes in agricultural practices and urban development, overhunting, brought about a significant decline in the Hawaiian Duck population early in the 20th century. In 1949, an estimated 500 Hawaiian Ducks remained on Kaua'i and about 30 on O'ahu. By the 1960s, Hawaiian Ducks were found only in small numbers on Kaua'i and probably on Ni'ihau. From the late 1950s through the early 1990s, Hawaiian Ducks were reintroduced to O'ahu, Maui, and Hawai'i (Paton 1981; Bostwick 1982; Engilis et al. 2002) through captive propagation and release. More recently Engilis et al. (2002) estimated the current statewide population of pure Hawaiian Ducks to be 2,200 birds, with 2,000 on Kaua'i and 200 on Hawai'i. The total Hawaiian Duck population appears to be increasing based on the biannual waterbird count, due primarily to increases in the Hawaiian Duck population on Kaua'i, but Hawaiian Ducks are declining on other islands.

Life History: Hawaiian Ducks breed year-round, but the majority of documented nesting records are from March through June (Engilis et al. 2002). In Kauai lowlands, Hawaiian Ducks form pair bonds between November and May, with pairs dispersing to montane nesting localities. Hawaiian Duck numbers fluctuate seasonally at Hanalei National Wildlife Refuge, with the highest numbers in September and the lowest in June and July (A. Asquith, Hanalei National Wildlife Refuge, pers. comm. 1999). These seasonal changes may reflect dispersal into montane areas during the breeding season, perhaps indicating a later breeding period for these Kauai birds. Some pairs find suitable nesting habitat in lowland wetlands. Nests are on the ground near water, but little else is known of their specific nesting habits. There have been few documented records of nesting in areas populated by humans, particularly where cats, dogs, or mongooses are common. Clutch size ranges from 2 to 10 eggs (mean = 8.3) (Swedberg 1967). Incubation lasts approximately 30 days, with most chicks hatching from April to June. Hawaiian Ducks may congregate in substantially larger numbers when loafing or exploiting rich food sources. Concentrations of 200 or more Hawaiian Ducks have been observed at Hanalei National Wildlife Refuge. They are strong flyers and usually fly at low altitudes. Hawaiian Ducks exhibit intra-island movements but dispersal tendencies are still unclear (Engilis et al. 2002). Hawaiian Ducks, like Mallards, apparently are opportunistic feeders. Foods consumed include snails, insect larvae, earthworms, grass seeds, rice, green algae, and seeds and leaf from parts of wetland plants (Swedberg 1967). Feeding in wetlands and streams typically occurs in water less than 24 centimeters (9.4 inches) deep (Engilis et al. 2002).

Habitat Description: The Hawaiian Duck historically used a wide variety of natural wetland habitats for nesting and feeding, including freshwater marshes, flooded grasslands, coastal ponds, streams, montane pools, and forest swamplands at elevations ranging from sea level to 3,000 meters (9,000 feet) elevation. Agricultural and artificial wetlands such as taro patches, lotus ponds (*Nelumbo nucifera*), shrimp, fish, and sewage treatment ponds supplement natural wetland habitats and provide important feeding habitat for the Hawaiian Duck. There may also use irrigation ditches, flooded ephemeral fields, reservoirs, and the mouths of larger streams for feeding or nesting. Swedberg (1967) estimated that 90% of the Hawaiian Duck population on Kaua'i lives along that island's extensive upland stream system, between 300 and 1,200 meters (1,000 to 4,000 feet) elevation. A typical stream used by the Hawaiian Duck on the Big Island is 7 meters (23 feet) wide, swiftly flowing, strewn with boulders, and has heavily vegetated banks (Paton 1981). However, little information is available on habitat use of upland stream systems by the Hawaiian Duck. Ephemeral wetlands are important habitat for the Hawaiian Duck, although how they are used beyond foraging is unknown (Engilis et al. 2002). Hawaiian Ducks move regularly between Ni'ihau and Kaua'i in response to above-normal precipitation and the flooding and drying of Ni'ihau's ephemeral wetlands (Engilis 1988; Engilis and Pratt 1993). More information is needed on movement of the Hawaiian Duck in response to the availability of seasonal and permanent wetland habitats between the summer (dry) and winter (wet) seasons.

Threats: Hybridization with feral mallards is currently the primary threat to the recovery of the Hawaiian Duck. Extensive hybridization has occurred on Oʻahu, Maui, and Hawaiʻi, and with somewhat less hybridization on Kauaʻi (Fowler et al. 2008). Hybridization is unlikely to occur with wild migratory mallards that winter or pass through the islands since migrants occur in Hawaiʻi during their non-breeding season. As with all the other ground nesting birds in Hawaii, predation by introduced mammals including dogs, cats, and rats also pose a significant risk to Hawaiian Ducks. Damage to watershed by pigs, goats, and other feral ungulates may pose directs to nesting habitat.

Hawaiian Duck at Kauaʻi Lagoons: Hawaiian Ducks are relatively abundant on the resort property. During the course of the 2008-2009 nesting season, KL recorded a range of 2 to 60 ducks on the property. During that season, KL observed three Hawaiian Duck nests. It is thought that between two and ten pairs nest on the resort property each year (Alan P. Silva, pers. comm. 2010). Hawaiian Ducks have been recorded nesting at the irrigation pond and in the general Pond No. 3 area, as well as in the nursery which is located in the triangular parcel between the runways at Līhuʻe International Airport. Survival of the ducklings appears to be at less than 10% (Alan P. Silva, pers. comm. 2010). Potential causes of the relatively low survival rate of ducklings have not been identified, though predation by alien mammals, Cattle Egrets, and possibly predatory fish are likely to be the principal non-metabolic threats that the young birds face. Since Hawaiian Ducks are almost never seen on the golf holes, it is unlikely that golf play represents a significant threat to this species.

3.3.3.6 Hawaiian Petrel

Taxonomy and Species Description: The Hawaiian Petrel (*Pterodroma sandwichensis*) is a pelagic seabird of the Order Procellariiformes, Family Procellaridae. It was formerly considered to be a Hawaiian endemic subspecies of the nominate race of the Dark-rumped Petrel (*Pterodroma p. paeophrygia*). The Hawaiian sub-species has recently been elevated to a full species, based on work conducted by Tomkins and Milne (1991), and Browne et al. (1997), that differentiated the vocalizations and morphology between it and the nominate species (Banks et al., 2002). The nominate race has been renamed the Galapagos Petrel (*Pterodroma phaeophygia*). Both species are typical long-winged gadfly petrels, easily confused in flight with several other like species. Within and close to their breeding colonies Hawaiian Petrels are quite vocal, and their vocalizations are distinctive. Hawaiian Petrels are nocturnal feeders, subsisting primarily on squid, fish, and crustaceans caught near the sea surface (Simons 1985). Unlike shearwaters, Hawaiian Petrels are not known to dive or swim below the surface (Pitman 1986). Hawaiian Petrels forage widely across the central, northern and eastern Pacific Ocean, even during the breeding season (Pittman 1986, Warham 1990, Spear et al 1995, Simons et al. 1998, Adam 2007). Satellite tagged birds have been tracked traveling more than 10,000 kilometers on a single foraging trip to and from their breeding colony on the island of Maui (Adams 2007). Hawaiian Petrels produce and store a high-calorie oil in their foregut, which most scientists presume functions to ensure nourishment for chicks despite the Petrels' often unpredictable and widely dispersed food supply (Warham et al. 1976, Warham 1996, 1997, Jacob 1982). This oil production is unique to birds in the order Procellariiformes (Warham et al. 1976). Hawaiian Petrels feed during both daylight hours as well as at night where they search for squid, flying fish, goatfish, lantern fish, skipjack tuna, hatchetfish, and similar species, which they find near the surface of the

water (Wheeler 1975, Nelson 1976 Pittmen et al. 1997, Simons 1985). Hawaiian Petrels capture prey items primarily by scavenging on the surface of the ocean, though they have been recorded feeding by aerial dipping, pattering, scavenging and surface-seizing (Ashmole 1971, Pittman 1986).

Historic and Current Distribution: Historical information on the distribution of this species in the Hawaiian Islands is very spotty. Following the initial description of the species in the late 1880s there were few records of the species between the early 1900s and the 1930s, followed by a steady accumulation of reports and information between the 1940s and the present day (Banko 1980). Whether Hawaiian Petrels were truly extremely rare in those years, possibly due to human and introduced mammalian predation, or whether people simply were unaware of these nocturnal seabirds, is unclear. Within recent historic times, Hawaiian Petrels have bred on Maui, Kaua'i, Lāna'i and Hawai'i (Richardson and Woodside 1954, Simons and Hodges 1998, Pyle 1987, Telfer et al. 1987, DOFAW unpublished data 2006, 2009). The species is thought to be extinct on O'ahu (Harrison 1990). All attempts to estimate either world or individual island populations have been fraught with major problems. Spear et al. (1995) estimated from at-sea densities that the world population of Dark-rumped Petrels was 19,000, with at least 5,000 pairs nesting on Kaua'i and 1,600 pairs on Maui (Ainley et al. 1997). The recently re-discovered Hawaiian Petrel colony on Lāna'i appears based on survey efforts to contain thousands of birds, rather than hundreds of birds as first surmised (Jay Penniman, DOFAW, pers. comm. with R. David). The breeding population on Maui is relatively stable, due in large part to predator control efforts and protection by the National Park USFWS (Simons 1985, Hodges 1994). The population nesting within Haleakalā National Park is increasing (Cathleen Bailey, pers. comm. April 11, 2008). The status of the Hawaiian Petrel population on the Island of Hawai'i is unknown, although it is believed to be declining due to continued predation by introduced mammals. The breeding populations on Kaua'i are similarly under-researched, although the number of fledglings grounded each year and retrieved by the Save Our Shearwater program has remained steady, averaging 10 individuals per year from 1979 to 2008 (Save Our Shearwater Program Data).

Life History: The Hawaiian Petrel breeding cycle is quite synchronous and follows a timing pattern characteristic of Procellariiformes in general. First, breeding occurs at approximately five to six years of age, with an estimated 89% of the adult population breeding each year (USFWS 2005c). Birds begin arriving on breeding grounds and pairing in mid-February. A distinct pre-laying exodus occurs in late March. Egg-laying typically transpires between late April and mid-May, with chicks hatching in July and August after an average incubation period of 55 days (Simons 1985). Each breeding pair produces only one egg per year. Hatching success at Haleakalā has been estimated at approximately 70% (Hodges 1994), but no comparable data are available from Kaua'i, where the nests have never been studied (principally because of their very remote location, on very steep and inaccessible terrain). At the time of hatching, failed breeders and non-breeding adults depart the colony. Although there have been no studies of the breeding biology of this species on Kaua'i, it is probable that their breeding biology is similar to that of birds studied on Maui, and likely similar to that of other similar petrels such as the Galapagos Petrel, which has been studied extensively. If so, then it can be stated that chicks are born with a soft, powdery down, which is replaced after a fortnight by a slightly heavier down. The chicks spend most of their time sleeping, although they can move around the nest burrow. Both adults spend their time flying to sea to feed and bring home food for the chicks; this occurs at diminishing intervals over the span of the nesting period, which averages about 110 days total. Growth rate of the chicks is extremely fast. The size of a meal can vary from 10 to 110 grams, the latter figure represents more than one quarter of the parent's weight (USFWS 2005c). This amount of food is likely the most an adult can carry. Fledging begins in late September, during which time breeding adults begin to leave the nest. By the end of November, most adults and successful fledgling birds (estimated at about 85% of nestlings) have departed the islands (Simons 1985). It is probable that parental feeding visits drop to just one or two in the final month, causing the weight of the chicks to drop precipitously. Some individuals are deserted by their parents and up to six weeks before they fledge, while others are fed right up to the day of departure. Once the chicks

leave they will not return to land again for several years, when they will return to nest. Hawaiian Petrels are long-lived, with birds banded on Maui commonly reaching 35 years of age (Simons and Hodges 1998).

Habitat Description: Hawaiian Petrels spend nearly all of their lives at sea, returning to land only to breed. Known Hawaiian Petrel breeding areas on Kauaʻi are within interior valleys. Petrels on Kauaʻi excavate burrows beneath dense vegetation along valley headwalls, particularly favoring steep slopes covered with *ʻuluhe* fern (*Dicranopetris spp.*), though in at least one valley, petrel burrows are concentrated on the valley floor in dense native forest (R. David, personal observation). On Maui and Hawaiʻi, relictual colonies are mainly found in sparsely vegetated sub-humid and sub-alpine areas on Haleakalā and Mauna Loa, respectively. Hawaiian Petrel nests in colonies on Maui and Hawaiʻi are typically widely dispersed, however densities in at least one colony matrix at Lumahaʻi Valley on Kauaʻi are apparently quite dense. Hawaiian Petrels, like most other Procellariiformes, appear to exhibit high degrees of nest-site and mate fidelity year after year. Hawaiian Petrels, along with other forest nesting seabirds, are an integral part of the forest nutrient cycle. The birds deposit a large quantity of nitrogen-rich fertilizer in the form of excrement in and around their burrows. In very wet forests such as those found on many Pacific Islands, soils are often relatively infertile and thus the added seabird generated nitrogen is significant.

Threats: Most Procellariiformes, including Hawaiian Petrels, have evolved in ecosystems free of terrestrial mammalian predators, and they are for the most part naïve of the threats that these predators pose to them. The only known native predator of Hawaiian Petrels is the Hawaiian Short-eared Owl, which causes some mortality at breeding colonies. Many biologists believe that predation of nesting Hawaiian Petrels by introduced mammals, such as the roof rat, Norway rat (*Rattus n. norvegicus*), Polynesian rat, domestic cat, domestic dogs, and the small Indian mongoose, is the most serious cause of mortality and breeding failure. Furthermore, they believe it has contributed significantly to the decline of the species. Small Indian mongooses have been thought to be absent from Kauai, but there have been a few recent reported sightings. Habitat destruction and alteration from pigs (*Sus s. scrofa*) uprooting burrows and facilitating the introduction of non-native plant species poses another serious threat to Hawaiian Petrels (Ainley et al. 1997, Cooper and Day 2003). Additionally, the introduced Barn Owl (*Tyto alba*) is thought to have killed Hawaiian Petrels, and it is thought that they also prey on Newell's Shearwaters. Artificial light sources and associated structures (e.g., fences, buildings, power lines, and telephone or utility poles) constitute another anthropogenic threat to Hawaiian Petrels. Particularly in urbanized areas of Maui and Kauaʻi, petrels have fallen to the ground after colliding with structures or becoming disoriented by artificial lights. While the numbers of downed Petrels documented on Kauaʻi per year have remained relatively small (averaging 10 birds annually), the threat posed by artificial lighting and new structures will likely increase over time unless more bird-friendly designs are incorporated into new lights, power lines, etc.

Hawaiian Petrel at Kauaʻi Lagoons: Currently there is virtually no nighttime activity on the resort property, as only one new building (Kalanipuʻu Building A) associated with the current and planned development projects is complete, and units within that building are at this point infrequently occupied. To date there have not been any downed Hawaiian Petrels recorded on the resort property. However, downed Hawaiian Petrels have been recorded at the adjacent Marriott hotel property (1979-2010 unpublished Save Our Shearwater data). As a result, it is reasonable to expect that following build-out Hawaiian Petrels are likely to be attracted to lights at KL.

3.3.3.7 Newell's Shearwater

Taxonomy and Species Description: The Newell's Shearwater (*Puffinus auricularis newelli*), is a Hawaiian endemic sub-species of the nominate species, the Townsend's Shearwater (*Puffinus a. auricularis)* of the eastern Pacific[12]. Its size and black and white coloring make it superficially similar in appearance to several other shearwater species that occur in the central and northern Pacific, which are sometimes referred to as Manx-type shearwaters. The Newell's Shearwater is a pelagic bird which forages over deep water east and south of Hawai'i, concentrating feeding in areas where tuna (*Thunnus spp*.) and other large, predatory fish have chased squid and other prey near to the ocean surface (Ainley et al. 1997). The birds feed by pursuit-plunging, diving 10 meters or more below the ocean surface to retrieve prey (Ashmole 1971).

Historic and Current Distribution: The Newell's Shearwater is known to nest on Kaua'i, Moloka'i, and Hawai'i (Ainley et al. 1997, Day et al., 2003, Day and Cooper 2002, Day et al. 2003).Newell's Shearwaters may also nest on Maui (Cooper and Day 2003), and possibly in very small numbers on O'ahu and Lana'i. Numbers of colonies and individuals are greatest on Kaua'i (Ainley et al. 1997). Spear et al. (August 1995: 624) estimated the total year-round at-sea population of Newell's Shearwaters in the Hawaiian Islands during the early 1990s at roughly 84,000 individuals (95% confidence interval of 57,000 to 115,000 for spring and 58,000 to 113,000 for autumn).

Using Spear et al.'s (1995) total population estimate and allowing for an estimated 7,600 one-year-old birds that do not visit Kaua'i, Ainley et al. (1995a) estimated that the Kaua'i population in the mid-1990s was approximately 65,000 birds, with a breeding population of about 14,600 pairs (Ainley et al. 1995a:42[13]). Using population models incorporating best estimates of breeding effort and success, Ainley et al. (2001) projected an annual population decrease of 3.2%. When anthropogenic variables influencing Newell's Shearwater mortality (e.g., predation, light attraction, and power line collision) were included, their models predicted an annual population decline of 6.1%, or approximately 60% every 10 years. If this projection is accurate, then the current population ought to be around 50,000 birds. There is little empirical data to confirm whether this estimate is in fact valid. However, the available scientific data, particularly radar studies conducted over the past decade and Save Our Shearwater data (Day et al., 2003; Planning Solutions Inc., 2003a, 2003b, 2004) strongly suggest that the population of Newell's Shearwater on Kaua'i has declined sharply over the past 10 years.

Life History: First breeding occurs at approximately six years of age, after which breeding pairs produce up to one egg per year. The high rate of non-breeding, among experienced adults occupying the colony during the summer breeding season, is comparable to that of similar species (Ainley et al. 2001). No specific data exists on longevity for this species, but other shearwaters may reach 30 years of age or more (see for example Bradley et al. 1989; del Hoyo et al. 1992). The Newell's Shearwater breeding season begins in April, when birds return to prospect for nest sites. A pre-laying exodus follows in late April and possibly May, and egg-laying begins in the first two weeks of June and likely continues through the early part of July. Pairs produce one egg, and the average incubation

[12] While the U.S. Fish and Wildlife Service listed the Newell's Shearwater as a subspecies, it should be noted that the International Union for Conservation of Nature redlist and many taxonomists recognize it as a full species.

[13] The breeding population of 14,600 pairs was estimated by multiplying the total population of 84,000 by 0.637 (proportion of total population of breeding age [6 years or older]), and then by 0.547 (the breeding probability). This estimate assumes that all Newell's Shearwater breeding occurs on Kaua'i.

period is thought to be approximately 51 days (Telfer 1986). The fledging period is approximately 90 days, and most fledging takes place in October and November, with a few birds still fledging into December (Save Our Shearwater data). Biologists have long believed that adult Newell's Shearwaters leave the nesting colony before or during fledging. However, very recent radar and at-nest electronic monitoring indicate that at least some adults continue to feed their young through fledging, and in fact some adults remain in the colonies after the fledglings have left (R. David, B. Zaun pers. comm. 2004).

Habitat Description: Newell's Shearwaters spend nearly all of their lives at sea, returning to land only to breed. The marine range of Newell's Shearwaters closely overlaps that of the Hawaiian Petrel, extending east as far as 120°W, north up to 22°N, and south to the equator near Hawai'i (Ainley et al. 1997). Isolated records exist as far west as the Mariana Islands and Johnston Atoll and as far south as the Marquesas Islands and Samoa, with at least one record from California (Pratt et al. 1987; Maryl Faulkner, email of 8/3/2007). Their breeding colonies are found at high elevations (160 to 1,200 meters), often in isolated locations and/or on slopes greater than 65 degrees (Ainley et al. 1997). Typical vegetation around colonies consists of open native forest dominated by *'ōhia* (*Metrosideros polymorpha*) with a dense understory of *'uluhe* fern (*Dicranopteros linearis*). The birds nest in short burrows excavated into the crumbly volcanic rock and ground, usually under dense vegetation, and under the base of trees. Burrows on Kaua'i ranged in depth from 46-175 cm with an average of 87.78 cm $\pm$ 22.2 SD (Telfer 1986). A single egg is laid in the burrow and one adult bird remains on the egg while the second adult goes to sea to feed. Unlike some seabirds, Newell's Shearwaters will not usually lay their eggs straight onto the ground if a nesting burrow is not available. Some colonies on Kaua'i are located in vertical cliff faces, where birds presumably are nesting in rock crevices rather than creating burrows (Wood et al. 2001). Newell's Shearwaters arrive and leave their burrows in the mountains during darkness and birds are seldom seen near land during daylight hours.

Threats: Cooper and Day (1995:4) states that the leading cause of the decline in population is predation by introduced mammals, although it acknowledges that there are a number of other potential contributing causes. *The Newell's Shearwater Five-year Workplan* drafted by the Newell's Shearwater Working Group[14] (October 2005) summarizes the causes contributing to the species population decline as predation, habitat degradation and loss, light attraction, collision with manmade structures, and natural disturbance. Loss of existing and potential nesting habitat due to clearing of forests for agriculture and urban development, mining of cinder cones, and recent volcanic eruptions on the Island of Hawai'i are among the terrestrial factors believed to be contributing to the decline of Newell's Shearwater.

Newell's Shearwater habitat has also been degraded by feral ungulates such as pigs (*Sus s. scrofa*) and goats (*Capra h. hirca*), which now are managed as game species. Pigs and goats facilitate the invasion of nonnative plants and perhaps predators. These animals also crush burrows and compact the soil. Invasive nonnative plants, such as the Moluccan albizia (*Albizia falcataria*), guava (*Psidium spp.*), and rose myrtle (*Rhodomyrtus tomentosa*), displace native vegetation and can completely alter vegetation structure and substrates typical of Shearwater nesting habitat. For example, the habitat at the Kaluahonu colony (southeastern Kaua'i) has been almost completely, and perhaps irreversibly, transformed in just a few years and is now dominated by nearly pure and impenetrable stands of rose myrtle and guava. Intensive surveys in 2003 indicate that the colony has either dramatically declined or been abandoned entirely (David et al., 2002; David 2003).

Urbanization on Kauai, chiefly on the eastern and northern shores, has been positively correlated with increased groundings or "fallout" of fledgling Shearwaters on their first nocturnal flight from the burrow to the sea (Telfer et al. 1987; Ainley et al. 2001). The young birds are attracted to and

[14] The Newell's Shearwater Working Group, created by the USFWS, is an informal working group consisting of experienced scientists from USFWS, DLNR, and other entities.

disoriented by light sources, and they occasionally collide with buildings, cars, and other obstacles, including power lines. More frequently, they simply fall to the ground, exhausted after fluttering around lights for long periods (Ainley et al. 1997, Podolsky et al. 1998). Risk of grounding for fledglings seems to increase on and around the new moon. Adult Shearwaters apparently are not attracted to lights to the same degree as fledglings, but adults do collide with power lines (Cooper and Day 1998). Once Shearwaters have been grounded they are extremely vulnerable to alien mammalian predators and other hazards, as it is very difficult for them to take flight from flat ground (Ainley et al. 1997).

The Save Our Shearwater program on Kaua'i has retrieved and released over 30,000 downed Newell's Shearwaters since 1979, giving them veterinary attention as needed, and then releasing them at elevated hack sites overlooking the ocean from which they can easily take flight. These efforts result in about 90% of retrieved birds being returned to the wild each year, most of whom would have almost certainly perished otherwise (Save Our Shearwater Database 1979-2008). Due to the paucity of data, some uncertainty remains with regard to the fate of recovered, rehabilitated, and released birds. It is unknown whether these birds go on to become members of the breeding population, or if they do, whether their breeding success is comparable to birds which have never fallen out. However, the Save Our Shearwater program remains the most effective mechanism available for restoring fallen birds to the wild.

Newell's Shearwaters at Kaua'i Lagoons: Currently there is no nighttime activity on the resort property, as only one new building (Kalanipu'u Building A) associated with the current and planned development projects is complete, and units within that building are not frequently occupied. To date one downed Newell's Shearwater was recorded on the resort property. In addition, downed Newell's Shearwaters have been recorded at the adjacent Marriott hotel property (1979-2008 unpublished Save Our Shearwater data). As a result, it is reasonable to expect that following build-out and occupation of the new buildings at the resort, downed Newell's Shearwaters may occur there.

3.3.3.8 Band-rumped Storm-Petrel

Taxonomy and Species Description: The Band-rumped Storm-Petrel (*Oceanodroma castro*) is a small seabird about 20 centimeters (8 inches) long, weighing less than 40 grams (1.5 ounces). It is an overall blackish-brownish bird with an evenly cut white rump band and uppertail-coverts. Sexes are alike in size and appearance. There is little or no seasonal variation in plumage. At sea field identification can be difficult, because several other white-rumped species of storm-petrels are similar in size, color, and shape. However, vocalizations at breeding colonies are distinctive and can be used to identify the species (Allan 1962).

Historic and Current Distribution: The Band-rumped Storm-Petrel is a wide ranging species found in the subtropics of the Pacific and Atlantic Oceans (Harris 1969). Breeding populations in the Atlantic are restricted to the eastern portions of the ocean, primarily in the Azores island group off northwestern Africa (Cramp and Simmons 1977). Wintering populations may occur as far west as the mid-Atlantic, with small numbers regularly reaching the coasts of North and South America (Cramp and Simmons 1977).

In the Pacific, there are three widely separated breeding populations - one in Japan, one in Hawai'i, and one in the Galapagos (Harris 1969; Richardson 1957). Populations in Japan and the Galapagos are comparatively large and number in the thousands (Coulter 1984; Hasegawa 1984), while the Hawaiian birds represent a small, remnant population of possibly only a few hundred pairs (Harrison

et al.1984; Harrison et al. 1990). Extensive at-sea surveys of the Pacific have revealed a broad gap in distribution of the Band-rumped Storm-Petrel to the east and west of Hawaiʻi (Pitman 1986; Spear et al. 1994).

The Hawaiian population of the Band-rumped Storm-Petrel is the only population within U.S. borders or under U.S. jurisdiction. Sub-fossil remains of Band-rumped Storm-Petrels have been found on Oʻahu and Molokaʻi and Hawaiʻi (Olson and James 1982, A. Ziegler pers. comm.), and their bones are abundant in some ancient Hawaiian midden (A. C. Ziegler pers. comm. as reported in Wood et al. (2002). Slotterback (2002) and Athens et al. (1991) found bones of this species in sea level midden. They speculate that Hawaiian populations once nested in coastal sites throughout Hawaiʻi and loss of habitat and predation by introduced mammalian predators including humans has been an important factor in the decline of this species. Evidence of existing nesting populations of Band-rumped Storm-Petrels in the Hawaiian Islands is based on detection of adult birds during breeding-season surveys and by retrieval of fledglings in the fall by persons involved in the Save Our Shearwater Program. Fledglings have been retrieved sporadically on the islands of Hawaiʻi and Kauaʻi, providing additional evidence of nesting colonies within the Hawaiian archipelago (Harrison et al. 1990, Banko et al. 1991).

Worldwide population of the species is uncertain, but is most likely less than 25,000 breeding pairs. Based on their field investigations, Wood et al. (2001a, 2001b) estimated that there are approximately 200 nesting pairs on Kauaʻi.

Life History: The species is long-lived (15 to 20 years) and probably does not breed until its third year (Ainley 1984). The nesting season occurs during the summer months, with adults establishing nesting territories in April or May. The incubation period averages 42 days (Harris 1969) and the young reach fledging stage in 64 to 70 days (Allan 1962; Harris 1969). During the day, adults spend their time foraging on the ocean surface. Food consists mainly of small fish, squid, crustaceans, oily scraps of marine animal carcasses, and garbage remnants (King 1967; Harris 1969). Adults visit the nest site after dark, where they can be detected by their distinctive calls. Since no nests have ever been found in Hawaiʻi, information on the breeding biology of this species can only be surmised based on the known breeding biology of this species in other locales, such as the Galapagos Islands. Nests are placed in crevices, holes, and protected ledges along cliff faces, where a single egg is laid (Allan 1962; Harris 1969).

Habitat Description: In September 2001, Wood et al. (2001a. 2001b) heard Band-rumped Storm-Petrels in Pōhakuao Valley, an isolated hanging valley on the Nāpali coast, and estimated that 50 to 60 birds were nesting on cliffs 370 to 460 meters (1,200 to 1,500 feet) in elevation. Between April and October of 2002, Wood et al. (2002) gathered data on the distribution and abundance of the Band-rumped Storm-Petrel at several locations on Kauaʻi. They concluded that there are nesting populations at several locations on the island. These include Waimea Canyon (east of Waimea Canyon lookout); four sub-populations along the Nāpali Coast (Kalalau, Pōhakuao, Nuʻololo Aina, Nuʻololo Kai); one site in the Kokeʻe region of Awaʻawapuhi; one site, called Awaʻawapuhi vista, at the eastern rim of Nuʻalolo and Awaʻawapuhi Valleys (accessed from the Awaʻawapuhi Trail, Kokeʻe State Park); and Lehua Islet off the north coast of Niʻihau. Three other sites were monitored and appear to be general fly-by sites where the petrels are in transit to nearby nests, including upper Waimea Canyon; Honopū (Kōkeʻe); and Kalalau Rim (Kokeʻe). Five of the sites that this team investigated represent previously unpublished locations. Wood et al. (2002) provide relatively detailed information on the vegetation characterizing the sea cliffs where the Band-rumped Storm-Petrel is nesting:

> *The Pōhakuao cliffs where storm-petrels nest are dominated by the shrub Chamaesyce celastroides var. hanapepensis (akoko), and two native grasses, Eragrostis variabilis (kawelu) and Panicum lineale (panic grass).*

Common herbs included Plectranthus parviflorus (‘ala‘ala-wai-nui), Dianella sanwicensis (‘uki‘uki), Peperomia tetraphylla, P. blanda var. floribunda, & P. cookiana (‘ala‘ala-wai-nui), Pilea peploides, and Peucedanum sandwicense (makou). Sedges included Carex meyenii and Cyperus phleoides. Vines included Alyxia oliviformis (maile), and Cocculus trilobus (huehue). Occasional ferns (and fern allies) were also a component of these cliff regions.

Tree species were distributed randomly around small ledges and terraces where soil pockets could accumulate and included Dodonaea viscosa (‘a‘ali‘i), Psydrax odoratum (alahe‘e), Metrosideros polymorpha var. glaberrima (‘ohi‘a), Hibiscus kokio subsp. Saintjohnianus (kokio ‘ula ‘ula), Diospyros spp. (lama), Acacia koaia (koai‘e)Antidesma platyphyllum var. hillebrandii (hame), Bobea elatior (‘ahakea), and Melicope pallida (‘alani) (Wood and LeGrande 2001; Wood et al. 2001).

Threats: Introduced predators are believed to be the most serious terrestrial threats facing the Band-rumped Storm-Petrel in Hawai‘i. Rats, cats, dogs, mongoose, and barn-owls are likely culprits. The Band-rumped Storm-Petrel, like the other seabirds discussed above, lacks effective anti-predator behavior, and has a lengthy incubation and fledgling period, making adults, eggs, and young highly vulnerable to predation by introduced mammals. Wood et al. (2002) observed owls flying along basalt cliff faces where the Band-rumped Storm-Petrels nest in Pōhakuao. These observations included consistent traffic of the Hawaiian Short-eared owl during the day and the screeching of barn owls in the evening. Another impact to the Band-rumped Storm-Petrel results from the effects of artificial lights on fledgling young and, to a lesser degree, adults. Artificial lighting of roadways, resorts, ballparks, residences, and other development in lower elevation areas both attracts and confuses night-flying Storm-Petrel fledglings, resulting in “fall-out” (Harrison et al. 1990) and collisions with buildings and other objects (Banko et al. 1991).

Band-rumped Storm-Petrels at Kaua‘i Lagoons: Currently, there is limited nighttime activity on the resort property, as only one new building (Kalanipu’u Building A) associated with the current and planned development projects is complete, and units within that building are at this point infrequently occupied. To date there have not been any downed Band-rumped Storm-Petrels recorded on the resort property.

3.3.4 PROTECTED SPECIES NOT COVERED BY THE HCP

As previously noted, there exists the possibility that other endangered species are present but as yet undocumented on the resort property, such as the ‘Ōpe‘ape‘a (Hawaiian hoary bat). KL is not requesting coverage for take of any such species for the following reasons. The Hawaiian hoary bat is widely distributed on Kaua‘i, especially in the lowland areas. However, there is no current empirical data suggesting that bats have collided or will likely collide with resort structures on Kaua‘i. While hoary bats have been documented to have become impaled on barbed wire fences in the continental United States (Iwen 1958) and Hawai‘i (Jeffrey 2007, pers. comm.) and some resort facilities are surrounded by chain-link security fencing, no bats have been found to have been injured by these fences. Hoary bats are drawn to outdoor lighting, as these tend to attract and concentrate flying insects that the bats forage on. However, their excellent visual and echolocation abilities together with their relatively low flying speed mean that they are not at significant risk from harm as a result of collisions with resort facilities and KL is not requesting this species be included in the ITP.

3.3.5 WILDLIFE HAZARD AT LĪHU‘E AIRPORT

Airports must comply with FAA safety standards in order to maintain their Airport Operating Certificate. The FAA safety standard regulations require airport operators to assess and manage hazards to aircraft operations posed by wildlife occurring on or near the airport. Serious concerns about bird-strike hazards at Līhu‘e Airport are long-standing. These concerns have increased in recent years due to the substantial increase of the Nēnē population at Kaua‘i Lagoons. Although

Nēnē is not the only bird species which poses a potential hazard to aircraft, it is the focus of aircraft safety concerns due to its size, flocking behavior, frequency of occurrence at the airport, and increasing population at Kauaʻi Lagoons.

Since at least the early 1990s, HDOT has contracted with USDA-WS to maintain a full-time staff at Līhuʻe Airport to continually monitor bird activity, and to actively harass and disperse Nēnē away from the airport. HDOT, through USDA-WS, prepared a Wildlife Hazard Assessment in 2005, and prepared an updated version in July 2009 (based on extensive monitoring data collected in 2008) focused exclusively on Nēnē. The 2009 WHA stated:

- There were a total of 2,791 Nēnē sightings at the airport in 2008.
- The numbers of Nēnē observed (dispersal events) at Līhuʻe Airport have increased steadily from 1,138 in 2004 to 2,252 in 2008.
- In 2008, an additional 539 Nēnē were observed but not dispersed at the airport. The majority of those observations were of Nēnē flying over the airport.
- In 2008, a total of 972 Nēnē were observed crossing the runway in 230 runway events.

HDOT submitted the 2009 Wildlife Hazard Assessment to the FAA, as required by FAA regulations. The FAA then determined that the airport must prepare a Wildlife Hazard Management Plan (Steven Hicks, FAA Airport Certification Safety Inspector, pers. comm. October 2009).

Also, both the HDOT and USDA-WS have recently expressed their views regarding aircraft hazards associated with bird populations at KL, in comments submitted in June 2009 on the State of Hawaiʻi Chapter 343 *Draft Environmental Assessment* for a portion of the KL expansion project (the Density Amendment component, separate from the activities dealt with in this document). The Hawaiʻi Department of Transportation comment letter states (DEA Comment Letter submitted by Brennon T. Morioka, Director, Hawaii Department of Transportation, June 22, 2009):

> *"DOT objects to and opposes any enhancement of the nesting area for Nene and/or other wildlife because of the potential hazard to aircraft operations at Lihue Airport…The applicant's Habitat Conservation Plan (HCP) should incorporate measures to eliminate the nesting habitat and provide mitigation measures…"*

The USDA-WS comment letter states (DEA Comment Letter submitted by Mike Pitzler, State Director, USDA Wildlife Service, June 19, 2009):

> *"Nēnē…have been identified as serious hazards to aviation at Lihue Airport…Wildlife Services strongly opposes maintaining this goose population so close to Lihue Airport and recommends that Kauai Lagoons work with the USFWS and DOFAW to eliminate the population of geese on Kauai Lagoons property adjacent to Lihue Airport in order to remove this hazard to aviation."*

Separately, HDOT Airports Division sent a letter to DOFAW on July 8, 2009 requesting assistance to address threats to aviation safety caused by the increasing population of Nēnē at Kauaʻi Lagoons (Letter from Brian H. Sekiguchi, Deputy Director-Airports, State of Hawaiʻi Department of Transportation, to Paul Conry, Administrator of the Division of Forestry and Wildlife, State of Hawaiʻi Department of Land and Natural Resources, July 8, 2009).

At an October 2009 meeting between DOFAW, USFWS, HDOT, FAA, USDA-WS, and KL the parties agreed that KL would develop an HCP to address resort construction and operation impacts only. Thus, this Draft Environmental Assessment and the HCP document which it supports, does not include or cover any specific Nēnē management measures designed to address aircraft safety issues, and commits KL to cooperate with the airport agencies and wildlife agencies in their separate efforts to address these issues pursuant to applicable FAA regulations. As discussed at the October 2009 meeting, that approach will consist of HDOT preparing the required Wildlife Hazard Management

Plan and submitting it to the FAA for review and approval. As part of its review and approval process, the FAA will consult with the USFWS pursuant to Section 7 of the ESA. HDOT must also coordinate with and seek any necessary approvals from DOFAW pursuant to HRS Chapter 195D. DOFAW, USFWS, HDOT, FAA, USDA-WS have continued to work together to develop a cooperative plan to identify sustainable ways to reduce the Nēnē population adjacent to the airport.

On April 14, 2011, the Governor of Hawaii, Neil Abercrombie, signed a Proclamation requiring the translocation of Nēnē from KL. The Proclamation suspends state endangered species laws as necessary to expedite efforts to move Nēnē to suitable locations on other islands. The Proclamation also directs DOFAW to develop a five-year Nēnē Action Plan that will determine how to translocate Nēnē to protect, maintain, and enhance the species. Translocation efforts are to begin immediately following the development of this plan. As the Proclamation will remain in effect for a period of only five years, all agencies will continue to work on a long-term comprehensive plan or solution regarding Airport safety and Nēnē on KL.

3.4 EXISTING SOCIO-ECONOMIC ENVIRONMENT, INFRASTRUCTURE, PUBLIC SERVICES, AND LAND USE

3.4.1 POPULATION

According to the 2000 U.S. Census, Kaua‘i’s Year 2000 resident population was 58,500, about 14% higher than in 1990. The total island population amounted to 4.8% of the Hawai‘i’s population, making it the least populated of the State’s four major counties (Honolulu, Maui, Kaua‘i, and Hawai‘i, excluding Kalawao County). A 2008 U.S. Census estimate suggested the population of Kaua‘i County reached 62,828, a 7% increase since 2000 and still the least populated of the State’s four major counties (U.S. Census Bureau 2008). Over the next 10 years, most of the growth on the island is expected to be in Kukui‘ula and Po‘ipū along the south shore; Līhu‘e, Wailua, and Kapa‘a on the windward side; the Princeville area on the north shore; other existing urban centers; and some agricultural subdivisions. Little or no growth is anticipated in the mountainous interior of the island.

The estimated July 2007 population of the Līhu‘e Census Defined Place (CDP) was 6,101. The median age was 44 years, substantially higher than the Hawai‘i State average of 36.2 years. The CDP’s estimated median household income in 2008 was $60,474. This is substantially higher than the $44,906 recorded in the 2000 census, but lower than Hawai‘i’s 2008 statewide average of $67,214. The estimated median house or condo value in 2008 was $558,205, almost exactly the same as the statewide average of $560,200. (www.city-data.com/city/Lihue-Hawaii.html)

The U.S. Census’ American Community Survey 3-Year Estimates 2006-2008 Data Set for Kaua‘i County provides a wide range of data that characterize the socio-economic characteristics of the County. It shows that the resident population is nearly evenly split between male and female and that the median age was 39.4 years. The age distribution was as follows:

Age Range	***Percent of Total Population***
Under 18 years	22
18 to 24 years	8
25 to 44 years	26
45 to 64 years	28
65 years and over	15

The same data indicate the following about ethnicity, housing, and household characteristics.

3.4.1.1 Ethnicity

As can be seen in Table 3.5 and in Table 3.6, Kaua'i County (like the rest of Hawai'i) is a multi-ethnic community. The breakdown on the island is quite similar to that of the State as a whole. However, in general, there are relatively fewer Japanese and Chinese in the population than is true for the State as a whole, and rather more Filipinos and Caucasians.

Table 3.5. Ethnicity by County: 2008

Ethnic Stock 1/	*State Total*	*City and County of Honolulu*	*Hawaii County*	*Kauai County*	*Maui County*
All groups	1,257,607	880,308	172,004	62,669	142,626
Unmixed (except Hawaiian)	699,622	493,181	88,041	33,796	84,604
Caucasian	256,381	138,078	54,860	16,707	46,736
Black	7,380	6,842	195	144	199
Japanese	220,201	179,755	20,273	7,258	12,915
Chinese	47,767	44,706	1,688	405	968
Filipino	148,773	106,394	10,455	9,156	22,768
Korean	8,001	6,989	547	66	399
Samoan/Tongan	11,118	10,415	24	61	619
Mixed (except Hawaiian) 2/	252,147	185,796	31,991	11,674	22,685
Hawaiian/part Hawaiian	305,838	201,331	51,971	17,198	35,337

Note: Definitions used in this table differ from those in reports by the U.S. Census Bureau. In the 1980 and 1990 census tabulations, a person's ethnicity was determined by self-identification or by the race of the mother, thus mixed race was not a separate category. For the Census 2000, people were allowed to select more than one race.

1/ Ethnicity is based on the ethnicity of the father and mother (four possible listings for each parent).

2/ Includes other ethnicities not listed, don't know, refused or missing (58,743). The figure shown is the weighted figure.

Source: Hawai'i State Department of Health, Office of Health Status Monitoring, special tabulation from the Hawai'i Health Survey.

3.4.1.2 Household Characteristics

In 2006-2008 there were 22,000 households in Kaua'i County, and the average household size was 2.8 people. Families made up 71% of the total. Nearly three-quarters of the families consisted of married-couple families; the remainder were classified as "other families". Other population and household characteristics include the following.

- Nonfamily households made up 29% of all households in Kaua'i County. Three-quarters of the nonfamily households were people living alone; the other quarter consisted of people living in households in which no one was related to the householder.

- Of people reporting one race alone, 9% were Native Hawaiian and Other Pacific Islander, 32% were Asian, 35% were White. Twenty-two percent reported two or more races. Ten percent of the people in Kaua‘i County reported being Hispanic.

Table 3.6. Kaua‘i County Ethnicity Compared to Statewide Ethnicity: 2000.

Ethnic stock 1/	*State total*		*Kauai County*	
	Number	*Percent*	*Number*	*Percent*
All groups	1,257,607		62,669	
Unmixed (except Hawaiian)	699,622	55.6%	33,796	53.9%
Caucasian	256,381	20.4%	16,707	26.7%
Black	7,380	0.6%	144	0.2%
Japanese	220,201	17.5%	7,258	11.6%
Chinese	47,767	3.8%	405	0.6%
Filipino	148,773	11.8%	9,156	14.6%
Korean	8,001	0.6%	66	0.1%
Samoan/Tongan	11,118	0.9%	61	0.1%
Mixed (except Hawaiian) 2/	252,147	20.0%	11,674	18.6%
Hawaiian/part Hawaiian	305,838	24.3%	17,198	27.4%
Note: Definitions used in this table differ from those in reports by the U.S. Census Bureau. In the 1980 and 1990 census tabulations, a person's ethnicity was determined by self-identification or by the race of the mother, thus mixed race was not a separate category. For the Census 2000, people were allowed to select more than one race.				
1/ Ethnicity is based on the ethnicity of the father and mother (four possible listings for each parent).				
2/ Includes other ethnicities not listed, don't know, refused or missing(58,743). The figure shown is the weighted figure.				
Source: Hawai‘i State Department of Health, Office of Health Status Monitoring, special tabulation from the Hawai‘i Health Survey.				

- Eighty-seven percent of the people living in the County during this period were born in the United States. Of those, two-thirds were born in Hawai‘i. Thirteen percent of the people living in Kaua‘i County in 2006-2008 were foreign-born.
- Among people at least five years old living in Kaua‘i County in 2006-2008, 18% spoke a language other than English at home. Of those, only a small fraction (8%) spoke Spanish; most spoke some other language; 38% reported that they did not speak English “very well.”
- The survey results indicated that 84% of the people at least one year old living in Kaua‘i County were living in the same residence one year earlier; 10% had moved during the past year from another residence in the same county, 2% from another county in the same state, 4% from another state, and 1% from abroad.
- The educational level of Kaua‘i County residents is moderately high. Nearly 90% of people 25 years and over had at least graduated from high school and almost a quarter had a bachelor’s degree or higher.

- The total school enrollment in Kaua'i County was 13,000. Nursery school and kindergarten enrollment accounted for 1,400 and elementary or high school enrollment was 9,800 children. College or graduate school enrollment was 2,200.
- As detailed in Table 3.7, the median income of households in Kaua'i County during the 2006-2008 survey period was $62,359. Eighty-two percent of the households received earnings and 20% received retirement income other than Social Security.

Table 3.7. Household Income and Benefits.

	Households	
Annual Household Income	***Number***	***Percent***
Less than $10,000	1,435	6.5%
$10,000 to $14,999	919	4.2%
$15,000 to $24,999	1,663	7.6%
$25,000 to $34,999	1,754	8.0%
$35,000 to $49,999	2,821	12.8%
$50,000 to $74,999	4,426	20.2%
$75,000 to $99,999	3,184	14.5%
$100,000 to $149,999	3,600	16.4%
$150,000 to $199,999	1,294	5.9%
$200,000 or more	862	3.9%
Total households	**21,958**	100.00%
Median household income	$62,359	
Mean household income (dollars)	$79,109	
No. of Households Reporting Earnings	17,914	81.6%
Mean earnings by Households Reporting Earnings	$76,077	
No. of Households with Social Security	7,122	32.4%
Mean Social Security income	$14,434	
No. of Households with retirement income	4,424	20.1%
Mean retirement income (dollars)	$20,528	
No. of Households with Supplemental Security Income	458	2.1%
Mean Supplemental Security Income	10,936	
With cash public assistance income	668	3.0%
Mean cash public assistance income (dollars)	4,774	
With Food Stamp benefits in the past 12 months	1,337	6.1%
Annual Family Income	**15,611**	**15,611**
Less than $10,000	665	4.3%
$10,000 to $14,999	317	2.0%
$15,000 to $24,999	1,059	6.8%
$25,000 to $34,999	1,199	7.7%
$35,000 to $49,999	1,812	11.6%
$50,000 to $74,999	3,423	21.9%
$75,000 to $99,999	2,537	16.3%
$100,000 to $149,999	2,670	17.1%
$150,000 to $199,999	1,146	7.3%
$200,000 or more	783	5.0%
Median annual family income	$70,010	
Mean annual family income	$87,890	
Per capita income (dollars)	28,755	

Source: Selected Economic Characteristics: 2006-2008, Data Set: 2006-2008 American Community Survey 3-Year Estimates, American Community Survey

- Thirty-two percent of the households received Social Security. The average income from Social Security was $14,434. These income sources are not mutually exclusive; that is, some households received income from more than one source.
- In 2006-2008, 8% of Kaua'i residents had incomes at or below the official poverty line. Nine percent of related children under 18 were below the poverty level, compared with 8% of people 65 years old and over. Seven percent of all families and 21% of families with a female householder and no husband present had incomes below the poverty level.
- As might be expected on an island with limited public transportation, nearly all households (96%) reported having access to a car, truck, or van for private use. Multi-vehicle households are common (41% said they have two vehicles and another 28% said they have three or more).

3.4.1.3 Housing Characteristics

In 2006-2008, Kaua'i County had a total of approximately 29,000 housing units. Of the total housing units, three-quarters were in single-unit structures, and one-quarter in multi-unit structures; very few (less than one-half percent) were mobile homes. The housing stock is relatively new, on average, with nearly 30% having been built since 1990. Approximately 22,000 of the housing units were occupied; of those, 14,000 (64%) were owner-occupied and 8,000 (36%) were renter-occupied. The survey reports one-quarter of these as being vacant, but this is almost certainly the result of many being second homes that are occupied part time by their owners and left unused the remainder of the time.

The survey reported relatively high housing costs. Renters, who composed 46% of the total, had median rental payments of $1,245/month. The median monthly housing cost for homeowners with mortgages was $2,030; the average monthly housing cost reported by the 19% of the homeowners who did not have mortgages was $453. Fifty-two percent of owners with mortgages, 19% of owners without mortgages, and 46% of renters in Kaua'i County reported spending 30% or more of household income on housing.

3.4.2 ECONOMIC BASE

The driving forces for the economy of Kaua'i County are tourism, agriculture, and defense expenditures. Slow to moderate economic and population growth is anticipated over the next decade.

3.4.2.1 Tourism

Over 1.25 million people visited Kaua'i in 2006. The average daily visitor census in that year was just under 21,000. This means that on average one visitor was present for approximately every three residents (DBEDT 2007). The visitor count rose to almost 1.3 million people in 2007, but declined sharply in 2008 as a result of the precipitous downturn in the world economy. DBEDT's provisional estimate of Kaua'i visitor arrivals for all of 2008 is 1,033,449, down over 20% from the previous year. At this time, no one has accurate estimates of the speed at which the visitor arrivals are likely to recover, but DBEDT forecasts dated February 20, 2009, suggest that the number of statewide visitor arrivals in 2012will still be over 6% below the number recorded in 2007.

As shown in

Table 3.8 below, as of 2008, Kaua'i had approximately 9,200 visitor units, ranging from first-class resorts to hostels. Hotel rooms numbered about 2,575 and accounted for only a bit over one-quarter of the island-wide total inventory. An almost equal number of the visitor accommodations were condominium hotels, and a slightly smaller percentage were time share condominium units. Almost two-thirds of all units were located in two areas: Kōloa-Po'ipū-Kalāheo and Kawaihau.

Table 3.8. Visitor Unit Inventory Unit Type: 2007 and 2008.

Type	*2008 Units*	*2007 Units*	*Change From 2007*	*% Change From 2007*
Apartment/Hotel	8	8	0	0.0%
Bed & Breakfast	110	98	12	12.2%
Condominium Hotel	2,556	2,495	61	2.4%
Hostel	40	40	0	0.0%
Hotel	2,575	2,567	8	0.3%
Individual Vacation Unit	1,621	1,417	204	14.4%
Timeshare	2,276	2,035	241	11.8%
Other	17	32	-15	-46.9%
Total	9,203	8,692	511	5.9%

Source: Table 3, 2008 Visitor Plant Inventory. Hawai‘i. DBEDT.

3.4.2.2 Agriculture

Sugarcane cultivation was the economic mainstay of Kaua‘i for more than a century. Its importance has declined greatly over the past several decades, and Gay & Robinson’s cessation of sugar operations on Kaua‘i at the end of 2009 marked the end of sugar cultivation on the island. Over 45,000 acres of former sugarcane land have been taken out of production as the industry has contracted. Some of the fields have been planted in diversified crops, including coffee, papaya and other fruits, seed corn, flowers and nursery products, vegetables, and melons. A few areas have been converted to aquaculture, and some former sugarcane fields have been used for residential and other urban development. Despite this, most of the former sugarcane land is now used for grazing cattle which, in recent years, has allowed a growing cattle industry on Kaua‘i even though grazing is a comparatively low-value use of the land. Due to the contraction in the sugar industry, agriculture is now the smallest of the three major industries (State of Hawai‘i, Department of Labor and Industrial Relations, June 2009). This is likely to remain true, though it is possible that some expansion may occur, especially if biofuels become a viable source of power.

3.4.3 PUBLIC INFRASTRUCTURE

3.4.3.1 Ground Transportation Facilities

3.4.3.1.1 Highways and Roads

Kaua‘i’s regional roadway system consists principally of two-lane roads connecting major developed areas on the island. These two-lane facilities vary in quality from a narrow, winding highway north of Hanalei to high-quality arterial highways, such as Kūhiō Highway, Kaumuali‘i Highway, and Kapule Highway. A short segment of four-lane, undivided highway is located in Līhu‘e town and a three-lane section is located between Hanamā‘ulu and Waipouli. Kaua‘i is served by two major highways that connect in Līhu‘e. The southern and western parts of the island are served by Kaumuali‘i Highway (Route 50), which begins at its intersection with Kūhiō Highway (Route 56) in Līhu‘e, and ends at Mānā on the west shore of Kaua‘i. The east and northern sections of the island are served by Kūhiō Highway, which begins at its intersection with Kaumuali‘i Highway in Līhu‘e and ends at Hā‘ena on the north shore.

The island’s main arterial roadways are congested, providing relatively low levels of service throughout much of the day. As documented in the Kaua‘i Long-Range Land Transportation Plan (State of Hawai‘i Department of Transportation 1997), major roads in Līhu‘e, west to Maluhia Road, and east to Kapa‘a are rated Level of Service D, E or F for average daily traffic. Extremely poor conditions can be observed in Kapa‘a Town and during peak hours on Kaumuali‘i Highway leading

into Līhuʻe. Collector roads, such as Kuamoʻo Road in Wailua, also suffer congestion during peak hours. Curing the existing deficiencies would require widening Kaumualiʻi Highway between Līhuʻe and Maluhia Road, as well as providing a permanent by-pass for Kapaʻa.

3.4.3.1.2 Bus Transit

Public transit on Kauaʻi is quite limited. The Kauaʻi Bus operates a public (fixed route) bus service and a paratransit (door-to-door) bus service from Hanalei to Kekaha. The paratransit service is for senior citizens, participants in certain agency programs, individuals at the Wilcox Hospital Adult Day Care Center, and residents with disabilities. Currently, the system services thirteen bus routes; in March 2009 the system ridership was 37,198 from the general public and 5,257 paratransit passengers, for a total of 42,455 person-trips (http://www.kauai.gov/Government/Departments/TransportationAgency/TransitAdvisoryCommittee/tabid/476/Default.aspx). Ridership has more than doubled over the past decade.

3.4.3.2 Airports

The Airports Division of the State Department of Transportation operates two airports on Kauaʻi. Līhuʻe Airport, which is discussed above, is the primary air terminal for the island. Līhuʻe Airport occupies 872 acres immediately east of the project site. The airport, which serves as Kauaʻi's primary gateway for all arriving and departing residents and visitors, provides passenger and aircraft facilities for domestic overseas carriers, interisland carriers, commuter/air taxi, air cargo, and general aviation activities. Airfield facilities include two runways (6,500' x 150'), taxiways, aprons, eight gates, navigational aids, airport traffic control tower, and helipads. During the last full year for which audited data are available (fiscal year 2008, which ended on June 30, 2008), 2,884,600 passengers enplaned or deplaned at the airport. During that same period there were just fewer than 122,000 aircraft operations.

The second is Port Allen Airport. This general aviation airport has minimal facilities and is located one mile southwest of the town of Hanapēpē, which is more than 15 miles to the west of the KL site.

3.4.3.3 Harbors

3.4.3.3.1 Commercial Harbors

Kauaʻi's two commercial harbors, Nāwiliwili Harbor and Port Allen Harbor, are owned and operated by the Harbors Division of the State Department of Transportation. Nāwiliwili Harbor, which lies just to the south of the Kauaʻi Lagoons site, is the larger and more active of the two. It serves as the island's primary commercial harbor. Facilities include three piers for the handling of both overseas and inter-island general and containerized cargo. The harbor is also used for charter boat fishing, recreational boating, and as a port-of-call for passenger cruise ships. Port Allen Harbor is situated off of Hanapēpē Bay on the east side of the Hanapēpē River. The deepwater port has a single pier and complements the primary harbor facilities at Nāwiliwili on the east side of the island.

3.4.3.3.2 Small Boat Harbors

Kauaʻi has four small boat harbors, Nāwiliwili, Port Allen, Kīkīaola, and Kukuiʻula. These facilities are owned by the State of Hawaiʻi and are managed by DLNR, Division of Boating and Ocean Recreation (DOBOR). In addition, DOBOR manages various boat launching ramps. Nāwiliwili Small Boat Harbor is located two miles southwest of Līhuʻe. The 32-acre facility has 48 berths, 12 moorings, two ramps, two piers, and a harbor office and restroom. It is located adjacent to the commercial harbor. The other small boat harbors are located far away from the project site.

3.4.3.4 Wastewater Treatment and Disposal

The County operates four wastewater systems (these serve Waimea, Hanapēpē-'Eleʻele, Līhuʻe-Hanamāʻulu, and the Kūhiō Highway corridor between Wailua and Kapaʻa). KL is served by the Līhuʻe-Hanamāʻulu wastewater treatment plant. The State DOH regulates the operations of that system.

3.4.3.5 Solid Waste Collection and Disposal

The County plays the primary role in solid waste management on Kauaʻi. It provides direct service to the public by collecting solid waste and operating facilities and programs for reuse and disposal. With the exception of hazardous materials, the County is also responsible for regulating the disposal of solid waste. County solid waste facilities and services are administered by the Road Construction and Maintenance Division of the Department of Public Works.

The largest facility is the Kekaha Landfill. Phase II of this facility began operation in 1993 and is the primary disposal site for solid waste on Kauaʻi. This facility also serves as a drop-off point for segregated recoverable waste. Based on the limited capacity remaining in the current landfill property at Kekaha, it is anticipated that a new Landfill will be needed by January 2017, and it is in the process of selecting a site for a new landfill. In addition to the landfill, the County operates refuse transfer stations located in Hanalei, Kapaʻa, Līhuʻe, and Hanapēpē. Kauaʻi County also encourages neighborhood recycling and has established a number of sites that receive newspaper, glass, aluminum, and paper products. The existing development at Kauai Lagoons uses a private contractor which is responsible for providing refuse containers and hauling the material to the County Landfill.

3.4.4 PUBLIC SERVICES AND FACILITIES

3.4.4.1 Public Safety

3.4.4.1.1 Police

The resort is located in the district serviced by the Kauaʻi Police Department main station and administrative headquarters in Līhuʻe, which is located approximately one-half mile to the west.

3.4.4.1.2 Fire

The resort is in the district serviced by the Kauaʻi Fire Department main station and administrative headquarters in Līhuʻe. These are located on Rice Street approximately one mile west of KL.

3.4.4.2 Medical Services

Wilcox Memorial Hospital, located in Līhuʻe, is the island's largest hospital. As part of Hawaiʻi Pacific Health (which also owns and operates Straub and Kapi'olani Hospitals on Oʻahu), Wilcox Memorial Hospital (and its associated clinic) provide a full range of medical services. It is situated approximately 1.5 miles northwest of the nearest point on the KL site.

3.4.4.3 Educational Facilities

The closest elementary school to the resort is the Elsi H. Wilcox Elementary School which is approximately 1.25 miles to the northwest of KL. Kauai High School is the nearest high school; it is located approximately three-quarters of a mile west-southwest of the nearest point on the KL property.

3.4.4.4 Recreational Facilities

The County of Kauaʻi operates and maintains nearly 70 active park and recreational facilities on the island, and these occupy a total of nearly 500 acres. These facilities range from tennis courts, to beach parks, to active sports fields. The tennis courts are located at Kapaʻa New Park, Wailua Homesteads Park, Wailua Houselots Park, Līhuʻe County Park, Puhi Park, Kōloa Park, Kalawai Park, Hanapēpē Park, Waimea High School, and Kekaha Park.

3.4.5 HISTORIC, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

The area covered by the HCP was developed into golf course in the early 1980s. An archaeological reconnaissance survey (Archaeological Research Center Hawaii, Inc., February 1980) found that the area had been previously impacted by sugar cane cultivation and cattle grazing and no archaeological or historic sites were present. The report recommended archaeological clearance with no further

investigation (Letter Report: Archaeological Reconnaissance of Ninini Point Area, February 27, 1980). The State DLNR Historic Preservation Division (SHPD), in a letter dated October 27, 2008, has determined that "no historic properties will be affected" by the proposed Project since the subject area has been previously assessed in a prior archaeological inventory.

A Cultural Impact Evaluation was undertaken for the resort property by Cultural Surveys Hawaii in October 2005. The report concluded that by the end of the 18th century, population in the Kalapakī Ahupua'a likely focused along the floodplains of valley lands and along the shoreline. In the valley lands, streams fed taro lo'i, while along the shore, fishponds supported the coastal population. Plateau areas of Kalapaki like the resort property may have been utilized for planting of dryland crops and gathering of timber and medicinal plants, but there does not appear to have been any intensive use.

As confirmed by historical records and archaeological investigation, sugarcane cultivation and development of plantation infrastructure was the dominant land use within the resort property and surrounding lands throughout the first half of the 20th century. The decades of sugar cultivation in the area would have eliminated any surface properties related to traditional Hawaiian culture that may have formerly existed. Further, plantation operations, and the sense that the area was private property, restricted access by cultural practitioners who may have formerly used the area. During the second half of the 20thcentury, resort development would have further eliminated any remnants of the former traditional landscape and further restricted access.

None of the community contacts queried for this evaluation identified any cultural sites or concerns specifically within KL. Ms. Cheryl Lovell-Obatake noted that portions of the property are still accessed by community members "because the area is the last remnant of open space with no buildings." These may be the more makai lands along the coast, outside the present Project Site. Ms. Lovell-Obatake also noted that she has never heard of any burials at KL.

3.4.6 SCENIC RESOURCES

Kaua'i is known for the great natural beauty and the variety of its landscape. According to information provided by KL, the facilities and landscaping present at the resort are designed to enhance the natural aesthetic value of the land and do not detract from any sites identified in the heritage resource maps contained in the Kaua'i General Plan.

3.4.7 EXISTING LAND USE

As discussed in Section 1.1, the 600 acres Kaua'i Lagoons Resort contains a variety of land uses. These include golf courses, golf and racquet club facilities, a network of man-made navigable lagoons, a restaurant, commercial development, and associated parking areas. KL is currently expanding and rearranging these uses.

3.4.8 EXISTING LAND USE POLICIES AND CONTROLS

A number of different public land use plans and controls govern the use of the area covered by the HCP. The principal elements of these are summarized below.

3.4.8.1 Hawai'i State Plan

The *Hawai'i State Plan* is a policy document intended to guide the long-range development of the State of Hawai'i by: identifying goals, objectives, and policies for the State of Hawai'i and its residents; establishing a basis for determining priorities and allocating resources; and providing a unifying vision to enable coordination between the various counties' plans, programs, policies, projects and regulatory activities to assist them in developing their county plans, programs, and projects and the State's long-range development objectives. The *Hawai'i State Plan* is dependent upon implementing laws and regulations to achieve its goals. While it does not contain any state-

specific provisions applicable to the area covered by the HCP, it is supportive of both KL’s intended land use plans and the resource protection objectives of the HCP.

3.4.8.2 State of Hawai‘i Land Use Law

Under The State Land Use Law (Act 187), Hawai‘i Revised Statute Chapter 205, all lands and waters in the State are classified into one of four districts: Agriculture, Rural, Conservation, or Urban. Conservation Districts, under the jurisdiction of DLNR, are further divided into five subzones: Protective, Limited, Resource, General, and Special (Hawai‘i Administration Rules, Title 13, Chapter 5). Kaua‘i Lagoons facilities are intermixed across three of the four land use classes present on the island. The majority of the resort is classified as “Urban” State Land Use District. Northern portions of the property, including the triangular nursery parcel and portions of the golf course are classified “Agriculture”. Finally, the strip of coastline on the southern boundary of the property near Kūki‘i Point is in the “Conservation” State Land Use District.

3.4.8.3 Hawai‘i’s Coastal Zone Management (CZM) Program

Hawai‘i’s Coastal Zone Management (CZM) Program (HRS 205A-2) is designed to protect valuable and vulnerable coastal resources by reducing coastal hazards and improving the review process for activities proposed within the coastal zone. As the entire State is within the Coastal Zone Management Area, a CZM Consistency Certification is needed.

3.4.8.4 Kaua‘i County General Plan

Chapter 46 of the Hawai‘i Revised Statutes (HRS) grants the counties certain powers and responsibilities. Among them is the power to regulate land development through zoning in accordance with a general plan. HRS §46-4 states in part:

> *Zoning in all counties shall be accomplished within the framework of a long range, comprehensive general plan prepared . . . to guide the overall future development of the county. Zoning shall be one of the tools available to the county to put the general plan into effect in an orderly manner.*

Article 14 of the County Charter states that the Planning Director shall prepare a general plan; that the Planning Commission shall review the general plan and shall transmit it with the Commission’s recommendations through the Mayor to the County Council; and, finally, that the County Council shall adopt the general plan by ordinance. The Kaua‘i County General Plan (last updated in 2000) provides guidance for land use regulations, the location and character of new development and facilities, and planning for County and State facilities and services. The General Plan states the County’s 20-year vision for Kaua‘i and sets policies for achieving that vision. The General Plan is a direction-setting policy document; it is not intended to be regulatory in the sense of a zoning code or other land use regulation. The policies are intended to guide County decision-making by mapping the direction of future development; by describing what kind of future development is desirable; and by setting priorities for public improvements. The General Plan also establishes a framework and priorities for future community-level planning and long-range planning for public facilities.

The Līhu‘e District Land Use Map of the Kaua‘i County General Plan designates the area covered by the HCP as Open and Resort. As expressed in the General Plan, the intent of the Open designation is to preserve, maintain or improve the natural characteristics of non-urban land and water areas that:

- are of significant value to the public as scenic or recreation resources;
- perform essential physical and ecological functions important to the welfare of surrounding lands, waters, and biological resources;
- have the potential to create or exacerbate soil erosion or flooding on adjacent lands;

- are potentially susceptible to natural hazards such as flood, hurricane, tsunami, coastal erosion, landslide or subsidence; or
- form a cultural, historic or archaeological resource of significant public value.

The General Plan policy for lands included within the "Resort Designation" is that they be used predominantly for housing and serving visitors to Kaua'i. In addition to hotels and multi- and single-family dwellings used for transient lodging, the Resort designation shall provide for commercial, recreational and public facilities that serve visitors or support the visitor industry. Lands designated Resort may also be used for residential purposes, including resort employee housing. As the General Plan identifies Līhu'e as a secondary resort destination, the existing use is consistent with the General Plan.

3.4.8.5 County Zoning

Chapter 8 of the Kaua'i County Code contains the comprehensive zoning ordinance that is one of the principal means of implementing the Kaua'i County General Plan. It provides standards and regulations for land development and the construction of buildings and other structures in the County. It establishes several land districts and delineates the respective types of permitted uses and development that can take place in those districts. All of the current and planned uses at KL are consistent with their intended uses as set for in the Comprehensive Zoning Ordinances (CZO) for Kaua'i County. For example, Section 8-4.3 (7) lists "golf courses" as a use which is generally permitted in a Resort District, and Sec. 8-7.3 describes "golf courses" as a use which is permitted in an Agriculture District but requires a use permit.

3.4.8.6 Special Management Area (SMA)

A small portion of the area covered by the HCP is located in the County's Special Management Area (SMA) boundary. "Development" (as defined under the SMA rules) requires a permit from the County Planning Commission.

4.0 IMPACTS AND MITIGATION

This chapter discusses potential impacts to the affected environment as a result carrying out the Proposed Alternative (approval of the HCP and issuance of an ITP) and the No Action Alternative, and provides a basis for the comparison of the alternatives. The potential impacts of constructing and operating the existing and proposed KL facilities are evaluated and discussed in relation to the existing conditions in the proposed project area. Environmental impacts are discussed in terms of their direct, indirect, and cumulative effects. *Direct effects* are caused by the action and occur at the same time and place as the action. *Indirect Effects* are caused by the action and occur later than the action or are farther removed in distance (40 CFR 1408.8). *Cumulative effects* are defined as: …the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or non-Federal) or person undertakes such actions (40 CFR 1508.7).

When applicable, avoidance, minimization, and mitigation measures for activities expected to, or with potential to, adversely impact environmental resources are also discussed. The USFWS, DLNR-DOFAW, USGS, and members of the Endangered Species Recovery Committee have provided guidance to assist KL in the development and selection of appropriate mitigation measures. The criteria used to determine the most appropriate mitigation measures for the Covered Species are discussed in detail in the HCP (October 2010). In carrying out the assessment, the USFWS considered each of the avoidance, minimization, and mitigation measures that KL has proposed to implement under the HCP

Table 4.1 and Table 4.2, respectively, characterize the extent to which each of the minimization measures and the mitigation measures that are proposed in the HCP will require:

- Initial setup of the procedures, reporting structure, and informational documents.
- Construction of physical facilities.
- Ongoing maintenance of facilities.
- Staff training.
- Ongoing field monitoring.

The tables below are then used as the basis for the discussion of potential impacts in the following sections of this chapter.

4.1 IMPACTS ON TOPOGRAPHY, GEOLOGY, AND SOILS

4.1.1 PROPOSED ACTION ALTERNATIVE

4.1.1.1 Impacts of Proposed HCP Conservation Measures on Topography and Soils

None of the measures listed in Table 4.1 or Table 4.2 involves changes to topography or actions that would change the availability of soils for other uses.

4.1.1.2 Construction, Operation and Management Impacts on Topography and Soils

Mass grading of some areas would be required for the new structures, pathways, and golf course modifications. In all, grading and earth moving associated with the complete development project will disturb approximately 230 acres of land. Project grading and construction would occur in phases.

As of late-2010, work on approximately 130 acres (56% of total project grading and infrastructure construction) has been completed.

Table 4.1. Characterization of HCP Minimization Measures Provisions

HCP Sec.	*HCP Provision*	*Initial Setup*	*Construction*	*Ongoing Maintenance*	*Staff Training*	*Monitoring*
4.2.1.1	Develop/Implement Endangered Species Awareness Program	●	●	--	●	--
4.2.1.2	Develop/Use Endangered Species Construction Contract Provisions	●	--	--	●	N
4.2.1.3	Conduct Pre-construction Endangered Species Surveys	●	--	--	●	--
4.2.1.4	Arrange for Trained Biological Monitors	●	●	●	●	●
4.2.1.5	Provide On-Site Construction Monitors	●	●	--	●	●
4.2.1.6	Erect Fencing Around Construction Areas	--	●	--	●	--
4.2.1.7	Implement Construction Best Management Practices	●	●	--	●	--
4.2.2.1	Roadways – Post Signs/Construct Speed Bumps	--	□	●	--	--
4.2.2.2	Lighting – Select/Install Bird-Friendly Lighting	●	□	--	--	--
4.2.2.2	Lighting – Maintain Bird-Friendly Lighting	--	--	●	--	--
4.2.2.3	Maintain Grounds	●	--	●	●	●
4.2.2.4	Educate/ instruct, & homeowner ITP compliance procedures	●	--	--	●	--
4.2.2.5	Establish/Implement Golf Course Staff Training Program	●	--	●	●	--
4.2.2.5	Establish/Implement Golf Course User Education Program	●	--	●	●	--

Key: ● = required
□ = minor activities required
-- = Not required or minimally required

Table 4.2. Characterization of HCP Mitigation Measures Provisions

HCP Sec.	*HCP Provision*	*Initial Setup*	*Construction*	*Active Management*	*Staff Training*	*Monitoring*
4.4.1	***Nēnē – Related Measures***					
4.4.1.1	General On-Site Nēnē Habitat Management and Maintenance	●	□	●	●	●
4.4.1.2	Management of Nēnē On-Site Nesting Areas	●	--	●	●	●
4.4.1.3	Nēnē Predator Control	●	--	●	●	--
4.4.1.4	Continue Following Emergency Nēnē Response Protocol	●	--	●	--	--
4.4.1.5	Facilitate DOFAW/USFWS Translocation & Population Management.	●	--	●	●	--
4.4.1.6	Develop Draft Kaua'i Nēnē Action Plan	●	--	--	--	--
4.4.2	***Waterbird-Related Measures***					
	Maintain Lagoons as Waterbird Habitat	●	□	●	●	●
	Continue Predator Control Near Lagoons (as in 4.4.1.3)	●	--	●	●	●
	Monitor for Unanticipated Effects and Take Responsive Action	●	--	□	--	●
4.4.3	***Seabird-Related Measures***					
	Monitor Lighting and Correct Excess	--	--	--	--	--
	Mitigate Through Contribution to the KSHCP					
4.5	***Monitoring***					
4.5.1	Habitat Management Monitoring	--	--	--	--	●
4.5.2	Predator Control Monitoring	--	--	--	--	●
4.5.3	Nēnē Monitoring	--	--	--	--	●
4.5.4	Waterbird Monitoring	--	--	--	--	●
4.5.3	Seabird Monitoring	--	--	--	--	●

Key: ● = required
□ = minor activities required
-- = not required or minimally required

Kaua'i Lagoons has used existing facilities, roadways and pathways insofar as possible, thereby avoiding further topographic disturbance required for the project. Because virtually all of the affected area has been previously modified by grading and/or intensive agriculture, the work would have little effect on natural landforms. As all of the area covered by the HCP has either been removed from agricultural use during past development of the site or is not suitable for agricultural use, the proposed action would not affect agricultural productivity. The remainder of project grading and construction is expected to be phased over the next five to seven years, greatly limiting the area that would be exposed at any one time.

All surface alterations associated with the proposed project would comply with applicable construction codes for erosion and sedimentation control during construction. Best Management Practices would be employed to prevent and minimize soil erosion during construction and operation of KL, as outlined in Table 4.3. Permanent soil stabilization (i.e. graveling, re-vegetation) would occur in temporarily disturbed areas as soon as practical after final grading. Impacts to soils are expected to be minor because of the use of the BMPs and revegetation of temporarily disturbed areas.

4.1.2 NO-ACTION ALTERNATIVE

No significant impacts to topography, geology, and soils are expected to occur under the No Action. Grading for new roads, buildings, and other project components would cause shallow alteration of bedrock in some areas. No significant geologic resources are known or expected to occur in the project area, so geologic alterations are expected to be minor. Under the no action alternative, no impacts to geologic features or soils would be expected because no new structures or amenities would be constructed or operated in the project area.

Table 4.3 Construction Best Management Practices

Pollutant	*Source/Activity*	*BMP*
Vegetation/ Rock	Excavation, grubbing, grading, stockpiles	Silt fences, temporary soil stabilization
Soil/ Sediment	Excavation, grading, stockpiles, watering for dust Control	Silt fences, protection of stockpiles, natural vegetation, sand bags, construction entrance stabilization, temporary soil stabilization, geotextile mats (internal access road slopes), avoid excess dust control watering
Oil and Gas	Construction equipment, vehicles	Regular vehicle and equipment inspection, prohibition of on-site fuel storage, drip pan for on-site tanker fueling, spill kits
Construction Waste	Construction debris, select fill, paint, chemicals, etc.	Protection of stockpiles, dumpsters, periodic waste removal & disposal, compaction & swales, containment pallets
Concrete Wash Water	Pouring of foundations	Containment in wash water pits, silt fences
Equipment &Vehicle Wash Water	Construction equipment	Containment berms around equipment washing area, off-site vehicle washing
Sanitary Waste	Portable toilets or septic tank	Sanitary/septic waste management
Source: Department of Environmental Services, City and County of Honolulu (1999).		

4.2 IMPACTS ON CLIMATE AND MICROCLIMATE

4.2.1 PROPOSED ACTION ALTERNATIVE

4.2.1.1 Impacts of Proposed HCP Conservation Measures on Climate

None of the measures listed in Table 4.1 or Table 4.2 involve activities that would alter topography, change vegetation, or alter on-ground conditions to the extent that they would have a measureable effect on microclimate (e.g., local temperature, wind patterns, temperatures, etc.). The construction work that would be required to complete such things as the installation of signage and speed-bumps, erect fencing designed to keep construction equipment away from the protected species, and allow monitors to carry out their work (some of which would involve vehicles with greenhouse gases (GHG)[15] emissions) is far too limited to make a measurable contribution to GHG emissions.

4.2.1.2 Impacts of Construction, Operation and Management on Climate

Construction and operation of the new facilities (if the requested ITP and ITL are issued) would have a greater ability than the HCP measures themselves to alter topography, change vegetation, and modify other factors that affect microclimate (e.g., local temperature, wind patterns, temperatures, etc.). However, none of the additional facilities that KL is seeking to develop over the term of the ITP involve physical changes that have the potential to affect temperature, rainfall, humidity, climate or other meteorological parameters substantially.

Construction and operation of the existing and proposed new facilities require the use of vehicles with fossil-fuel-fired internal combustion engines. It also entails the use of manufactured materials. To the extent that the equipment and vehicles involved in these manufacturing and transporting activities

[15]For purposes of the guidance, CEQ defines "GHGs" in accordance with Section 19(i) of Executive Order 13514 (carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride).

result in the emission of GHG, they have the potential to contribute to global warming and related changes in climate.

On February 18, 2010, the Council on Environmental Quality (CEQ) issued draft guidance explaining how the agencies of the Federal government should analyze the environmental effects of GHG emissions and climate change when they describe the environmental effects of a proposed agency action in accordance with Section 102 of NEPA and the CEQ Regulations for Implementing the Procedural Provisions of NEPA, 40 C.F.R. parts 1500-1508. The guidance states that if a proposed action would be reasonably anticipated to cause direct emissions of 25,000 metric tons or more of CO_2-equivalent GHG emissions on an annual basis, agencies should consider this an indicator that a quantitative and qualitative assessment may be meaningful to decision makers and the public.[16] The guidance notes that there is no established Federal protocol for assessing the effect of land management techniques (including changes in land use or land management strategies) on atmospheric carbon release and sequestration at a landscape scale.

GHG emissions from the activities at KL that are the subject of this EA will arise from the use of fossil-fuel-fired engines in maintenance equipment needed to ensure safe and efficient operation of the facilities and from vehicles that employees, residents, and guests use to access the resort complex. Based on factors developed by the U.S. Environmental Protection Agency (February 2009), GHG emissions from construction is estimated to be on the order of 1,000 metric tons per year. Calculations for Līhuʻe made using the "CoolCalifornia" GHG emissions calculator (http://www.coolcalifornia.org/business-calculator) are that GHG emissions related to the operation of the proposed development will be on the order of 15,000 metric tons per year. Because both rates are well below 25,000 metric tons per year level, no more detailed quantitative analysis was performed.

4.2.2 NO-ACTION ALTERNATIVE

Under the No Action Alternative, no adverse impacts to the existing climate would be expected because the proposed facilities would not be constructed and operated. This alternative also would not result in any beneficial impacts to climate.

4.3 IMPACTS ON HYDROLOGY

4.3.1 PROPOSED ACTION ALTERNATIVE

4.3.1.1 Impacts of Proposed HCP Conservation Measures on Hydrology

None of the HCP measures listed in Table 4.1 or Table 4.2 involve activities that would directly affect hydrology. They do not require changes to the existing lagoons, alter drainage patterns, increase water use, or entail activities that have the potential to alter water quality.[17] Neither do they entail the use of water that would require withdrawals from existing or new surface water sources. The features that would be managed under the HCP lie outside of the 100-year floodplain as mapped by Federal Emergency Management Agency. Thus, flood hazard would not be increased as a result of HCP-related measures.

[16]CEQ specifically notes that the level is not intended as an indicator of a threshold of significant effects, but rather as an indicator of a minimum level of GHG emissions that may warrant some description in the appropriate NEPA analysis for agency actions involving direct emissions of GHGs. It further states that it does not propose to make this guidance applicable to Federal land and resource management actions, but seeks public comment on the appropriate means of assessing the GHG emissions and sequestration that are affected by Federal land and resource management decisions.

[17]All existing water features that are involved are manmade impoundments created and maintained by the developers and operators of the resort. They did not exist prior to construction in the mid-1980s.

4.3.1.2 Construction, Operation and Management Impact to Hydrology

The resort and residential development that would occur under the HCP would result in minimal increases in impervious surfaces; thus, they would not significantly increase the volume of stormwater runoff. Localized topographic alterations resulting from site grading and the construction of building pads and roads will alter local drainage patterns and stormwater runoff pathways, but the existing balance of drainage into the internal water features and nearby ocean would be unchanged. The locations for all of the proposed construction lie outside of the 100-year floodplain as mapped by FEMA. Project-related activities would not alter drainage patterns or cause other changes that have the ability to affect flood recurrence intervals or the extent of the floodway. Thus, flood hazard would not be increased as a result of the proposed project.

The activities covered by the HCP would slightly increase the percentage of impervious surface within the 230-acre development area. However, as most of the runoff would be routed into confined areas where it can percolate into the ground rather than running off, it would not measurably alter the amount of groundwater recharge.

During construction, ground disturbance has the potential to increase the level of sediment and other pollutants in stormwater runoff, which could change the water quality of receiving waters. Because the area to be disturbed is over an acre, KL would be required to prepare a Notice of Intent for construction-related stormwater runoff pursuant to National Pollutant Discharge Elimination System (NPDES) regulations. The NPDES application would identify potential receiving waters for runoff, quantify the anticipated volume of runoff, and identify BMPs that will be used to prevent pollutants from leaving the site. BMPs anticipated to be used for the project are identified in Table 4.3. In addition to these BMPs, the following general construction management techniques would be incorporated to reduce impacts to hydrology, drainage, and water features under the Proposed Action:

- Clearing and grubbing would be held to the minimum necessary for grading, access and equipment operation.
- Erosion and sediment control measures would be in place prior to initiating earth moving activities. Functionality would be maintained throughout the construction period.
- Existing vegetative ground cover would not be disturbed more than 20 days prior to scheduled construction work.
- Construction would be sequenced to minimize the exposure time of the cleared surface area.
- Temporary soil stabilization measures would be used on disturbed areas remaining exposed for more than 30 days.
- Disturbed areas would be protected and stabilized prior to initiating new disturbance.
- Control measures (i.e. silt fences, sand bag barriers, sediment traps, geotextile mats, and other measures intended for soil/sediment trapping) would be inspected once weekly during dry periods and repaired as necessary.
- Control measures (i.e. silt fences, sand bag barriers, sediment traps, geotextile mats, and other measures intended for soil/sediment trapping) would be inspected and repaired as needed within 24 hours after a rainfall event of 0.5 inches or greater over a 24-hour period. During periods of prolonged rainfall, daily inspection would occur, unless extended heavy rainfall makes access impossible or hazardous.
- Records for all inspections and repairs would be maintained on site.
- Permanent soil stabilization (i.e. graveling or re-planting of vegetation) would be applied as soon as practical after final grading. KL would coordinate with DLNR and other specialists regarding selection of appropriate species for re-vegetation.

4.3.2 NO-ACTION ALTERNATIVE

Water resources in the area would not be impacted under the No Action Alternative because the proposed resort and golf course facilities would not be constructed or operated.

4.4 AIR QUALITY

4.4.1 PROPOSED ACTION ALTERNATIVE

4.4.1.1 Impacts of Proposed HCP Conservation Measures on Air Quality

None of the HCP measures listed in Table 4.1 or Table 4.2 involves activities that would directly affect air quality in any meaningful way. They do not require significant earthmoving and the use of fossil-fuel-fired equipment is limited to that from light trucks and landscaping equipment used by personnel assigned to the monitoring and maintenance and educational programs. These emissions would be temporary or infrequent. Potential air pollutants that may be emitted (depending on the equipment used) during the construction phase include hydrocarbons (HC), fugitive dust (PM10), CO, NOx, SO_2, and CO_2.

4.4.1.2 Construction, Operation, and Management Impacts on Air Quality

The construction and operation of the resort and residential facilities that constitute the project for which the HCP is being prepared would result the ongoing emission of regulated air pollutants. These emissions would be generated primarily through combustion of gasoline and diesel fuel for vehicles. Hydrocarbons (HC), fugitive dust (PM_{10}), CO, NO_x, SO_2, and CO_2 are among the pollutants that would be emitted in the greatest quantities. These pollutants would be released by equipment during earthmoving operations, by vehicles traveling project roadways, and by vehicles traveling to and from the project area.

KL would require construction contractors to comply with the emission limits in HAR §11-60.1 regarding air pollution control, specifically Section 11-60.1-33, regarding fugitive dust and the prohibition of visible dust emissions at property boundaries. In order to minimize any adverse effect on air quality, KL would require construction contractors to adhere to specific minimization measures (see below).

Construction BMPs detailed in KL's NPDES General Permit Notice of Intent would include measures relative to dust control, including ESC10 (Seeding and Planting), ESC11 (Mulching), ESC21 (Dust Controls), ESC23 (Construction Road Stabilization), and ESC24 (Stabilized Construction Entrances). KL and its contractors would use only water with no chemical additives for dust control.

In order to minimize any adverse effect on air quality, KL would require construction contractors to adhere to the following measures:

- Maintain all construction equipment in proper tune according to manufacturer's specifications.
- Maximize to the extent feasible, the use of diesel construction equipment meeting the latest certification standard for off-road heavy-duty diesel engines.
- Minimize the extent of disturbed area where possible.
- Use water trucks or sprinkler systems in sufficient quantities to minimize the amount of airborne dust leaving the site.
- Cover or continuously wet dirt stockpile areas containing more than 100 cubic yards of material.
- Implement permanent dust control measures identified in the project landscape plans as soon as possible following completion of any soil disturbing activities.

- Stabilize all disturbed soil areas not subject to revegetation, paving, or development using approved chemical soil binders, jute netting, or other methods.
- Lay building pads and foundations as soon as possible after grading unless seeding or soil binders are used.
- Limit vehicle speed for all construction vehicles moving on any unpaved surface at the construction site to 15 mph (24 kph) or less.
- Cover all trucks hauling dirt, sand, soil, or other loose materials.

During operation and maintenance of the facilities that would be constructed on land covered by the HCP (including activities related to the environmental and biological monitoring required by the permit conditions), there would be minor exhaust emissions from resident, staff, and vendor vehicles. There would also be minor emissions from periodic use of heavy equipment used for maintenance of the facility components. In addition to the maintenance equipment and vehicle emissions, operation of resort and golf course facilities would result in minor indirect emissions of greenhouse gases as a result of fossil fuel energy use for electricity. Because vehicle usage in the area would be low and emissions from operation of the facility would be minor, no significant adverse long-term impacts to air quality are anticipated to result from construction or operation of the proposed project.

4.4.2 NO-ACTION ALTERNATIVE

No change in existing air quality is expected under the No Action Alternative because the proposed facilities would not be constructed or operated.

4.5 IMPACTS ON SOUND LEVELS

4.5.1 PROPOSED ACTION ALTERNATIVE

4.5.1.1 Impacts of Proposed HCP Conservation Measures on Sound Levels

None of the HCP measures listed in Table 4.1 or Table 4.2 involve activities that would directly affect sound levels in any meaningful way. They do not require the use of heavy equipment or the conduct of loud activities during nighttime hours. The little equipment that would be used consists mostly of light passenger vehicles that would not measurably affect the level of transportation noise. The maintenance and/or increase in the population of certain species would not cause noise-compatibility issues with adjacent uses.

4.5.1.2 Construction, Operation and Management Effects on Sound Levels

Construction of the resort and residential facilities that would occur if the ITP/ITL are issued generate short-term construction-related noise. Site grading, vegetation clearing, and construction of the various facility related structures and other features would involve the short-term use of graders, excavators, bulldozers, cranes, cement trucks, haul trucks, and other heavy equipment.

If construction noise is expected to exceed State Department of Health "maximum permissible" property line noise levels, KL would obtain a permit from the State DOH to allow the operation of vehicles, cranes, construction equipment, power tools, etc., which emit sound levels in excess of the "maximum permissible" levels. The DOH noise permit does not limit the sound level generated at the construction site, but rather the times at which noisy construction can take place. Development of a few areas of the resort and golf course may involve work so close to the property line that a contractor may wish to obtain a State DOH construction noise permit. No occupied homes or noise sensitive buildings occur close to project area boundaries.

Potential noise impacts during construction of the resort and residential facilities would be mitigated by complying with the provisions of the State Department of Health Administrative Rules, Title 11,

Chapter 46, "Community Noise Control" regulations which require a noise permit if the noise levels from construction activities are expected to exceed the allowable noise levels stated in the Rules. The contractors would be made responsible for minimizing noise by properly maintaining noise mufflers and other noise-attenuating equipment, and to maintain noise levels within regulatory limits.

In addition, as portions of the adjacent development would occur within areas exposed to elevated noise levels from the adjacent airport, the Project's design guidelines would be specific in referencing this requirement for interior noise mitigation as needed. For any residential development located between the 60 to 65 Day/Night Noise Level (DNL) contours, design guidelines would be established which would set forth the various door, window and exterior building envelope treatment measures to be followed in the construction of the units to achieve an interior noise level of 45 DNL.

4.5.2 NO-ACTION ALTERNATIVE

Under the No Action Alternative, no change in existing noise conditions would occur in the project area because the proposed facilities would not be constructed or operated.

4.6 IMPACTS ON FAUNA

4.6.1 PROPOSED ACTION ALTERNATIVE

Up to this point, the discussion of potential effects on each resource has begun with a review of the anticipated effects of HCP-related measures (treating these as impacts of proposed HCP conservation measures) and then discussed the effects of construction, operation, and management activities that would occur if the requested ITP is issued. This section is organized focusing on net effects for each species.

The following sections assess the impacts of the Covered Activities, and the HCP avoidance, minimization, and mitigation measures, on each of the Covered Species. These impact assessments are premised on the assumption that the populations of Nēnē and the waterbird species at the resort remain at or below current (2010) levels.

4.6.1.1 Impacts on Nēnē

4.6.1.1.1 Effects of Construction Activities on Nēnē

Given the large number of Nēnē on the resort, KL conservatively estimates that its construction operations will result in the direct mortality of 1.5 birds per year for the construction period. This would persist only for the anticipated four year construction period.

4.6.1.1.2 Effects of Operations on Nēnē

Grounds Management and Maintenance. KL has worked closely with DOFAW and the USFWS to develop and implement numerous conservation measures at the resort. As a result, the KL Nēnē population is substantial and has been highly productive. Although development activity at the resort prior to the 2008-09 breeding season eliminated areas in which some Nēnē had nested during the prior several seasons; overall Nēnē breeding success in 2008-09 and in 2009-10 was the highest ever recorded at KL.

Golf Operations. There is information indicating that Nēnē have on occasion been hit by golf balls on the golf course, but there is no data as to how many times or how frequently this has occurred. Given the comprehensive golf operations avoidance and minimization measures described above, it is estimated that any such incidents would occur less frequently than whatever has historically been the case. For purposes of this HCP, it is estimated that take from golf operations may occur at the average rate of up to one mortality and four non-lethal injuries per year. This estimate is based on the best available information, including KL's close observation and monitoring of Nēnē over several years. The implementation of a comprehensive golf course monitoring plan would produce future

data regarding this issue, and the appropriateness of the take level requested in the HCP for this species.

Indirect take of dependent young for adult Nēnē occurs when an adult parent occurs during the breeding season (approximately September through March). Based on KL's monitoring data for the 2008/09 and 2009/10 breeding seasons, each Nēnē breeding pair produces approximately two goslings annually. Consequently, the amount of potential indirect take is calculated as follows:

- Fledglings per pair (2) x likelihood of mortality occurring during breeding season (0.6) x likelihood of breeding (0.6) x parental contribution (0.5) = 0.36.
- Lethal take (2.5 per year) + indirect take of dependent young (2.5 x 0.36) = 3.4 Nēnē per year

The calculation of Nēnē take is shown in Table 4.4.

Table 4.4. Estimated Effect on Nēnē.

Activity	*Take (avg. per year)*		*Indirect Take (avg. per year)*		*Total Take (avg. per year)*	
	Death	***Non-Lethal Injury***	***Death***	***Non-Lethal Injury***	***Death***	***Non-Lethal Injury***
CONSTRUCTION PERIOD	**1.5**	**0**	**0.55**	**0**	**2.05**	**0**
OPERATIONAL PERIOD						
Grounds Mgmt. & Maintenance	0	0	0	0	0	0
Golf Operations	1.0	4.0	0.36	0	1.36	4.0
Operational Period Total	***1.0***	***4.0***	***0.36***	***0.0***	***1.36***	***4.00***

Note 1: Lethal take (2.5 per year) + indirect take of dependent young (2.5 x 0.36) = 3.4 Nēnē per year

Note 2: To date Kauai Lagoons has not encountered an *injured* Nēnē resulting in an indirect take of eggs or goslings.

4.6.1.1.3 Effects of Avoidance, Minimization and Mitigation Measures

As described previously, KL would implement a suite of measures to avoid and minimize impacts to Nēnē. With respect to construction activities, these measures include implementation of an Endangered Species Awareness Program, performance of pre-construction surveys, performance of construction monitoring, installation of exclusion fencing, and implementation (by KL and its contractors) of specific Best Management Practices. With respect to operations activities, these measures include implementation of the Endangered Species Awareness Program for operations staff, performance of biological monitoring and notification of ground crews of the location of nesting activity, and implementation of a comprehensive golfer education and Nēnē avoidance program on the golf course. These measures are expected to minimize impacts to Nēnē at KL by making employees, contractors and visitors aware of the need to avoid harm to Nēnē (and informing them how to do so), and by taking proactive steps to avoid situations or activities that could harm Nēnē. The implementation of such measures has been factored into the estimates of construction and operations effects described immediately above.

Nevertheless, the potential for take cannot be eliminated. Consequently, KL will implement a suite of measures to mitigate unavoidable impacts. These measures include continuing a comprehensive predator trapping and control program; which has proven to be very effective at KL in terms of improving Nēnē breeding success and are expected to remain so. In addition, KL would develop, or fund the development of, a Nēnē action plan which is needed by DOFAW and the USFWS in order

to facilitate their translocation of Nēnē from KL's burgeoning population to other locations on Kaua'i and elsewhere in the state as part of the agencies' efforts to recover the overall population of the species.

4.6.1.2 Effects on Other Listed Waterbird Species

While Nēnē are by far the most numerous of the protected birds present on the KL site, four other waterbird species also use the area and have the potential to be affected by construction and/or operation of the various facilities. This section assesses the impacts of the Covered Activities on the additional four waterbird Covered Species (Hawaiian Moorhen, Hawaiian Coot, Hawaiian Duck and Hawaiian Stilt).

4.6.1.2.1 Effects of Construction Activities on Other Listed Waterbird Species

During the period 2007-2009, no known take of any of the other four listed waterbird species occurred as a result of KL construction activities such as site clearing, mass grading, or infrastructure or building construction. This is likely due to the implementation of the conservation measures developed by USFWS, DOFAW, and KL. In contrast to Nēnē, these other four waterbird species are very reluctant to venture near active construction operations. Consequently, it is unlikely that any take of the waterbird species would occur in the future as a result of new construction activities.

4.6.1.2.2 Effects of Operations on Other Listed Waterbird Species

Grounds Management and Maintenance. Based on data gathered on current KL operations, and implementation of the avoidance and minimization measures it is unlikely that any take of the four waterbird species would occur as a result of grounds management and maintenance operations.

Golf Operations – Hawaiian Coots. Hawaiian Coots have been known to congregate seasonally, especially in dry years, on portions of the golf course – occasionally in substantial numbers. There is information indicating that coots have on occasion been hit by golf balls on the golf course, but data has not been collected as to how many times or how frequently this has occurred. For the purpose of this HCP, KL is requesting permit coverage for the take of coots from golf operations at the average rate of up to three mortality and six non-lethal injuries per year (see Table 4.5). This is based on the best available information, including KL's observation and monitoring of coots over several years.

Golf Operations – Hawaiian Moorhen, Hawaiian Duck or Hawaiian Stilt. There is no information indicating that Hawaiian Moorhen, Hawaiian Duck or Hawaiian Stilt having been injured on the resort's golf courses. Based on the monitoring conducted during the period 2007-2009, KL expects that the Covered Activities would result in minimal impacts to the nesting or breeding of the four waterbird species.

- As described in Section 3.3.3.3, the Hawaiian Coot nests have never been documented on KL (although during the 2008-2009 season a pair of coots with a single chick was observed in the resort lagoons).
- Nesting on the KL property by Hawaiian Moorhen and Hawaiian Duck occurs on an annual basis in low-to-moderate numbers.
- Nesting by Hawaiian Stilt is extremely limited.

Consequently, KL anticipates that the Covered Activities would result in minimal impacts to breeding success to these additional four listed waterbird species. Diminished breeding success would be anticipated only if a breeding adult died as a result of the Covered Activities.

In order to be conservative KL is requesting the level of take shown in Table 4.5.

Table 4.5. Assumed Effects on Waterbirds.

Activity	*Take (avg. per year)*		*Indirect Take (avg. per year)*		*Total Take(avg. per year)*	
	Death	***Non-Lethal Injury***	***Death***	***Non-Lethal Injury***	***Death***	***Non-Lethal Injury***
CONSTRUCTION PERIOD	0	0	0	0	0	0
OPERATIONAL PERIOD						
Hawaiian Moorhen	1.0	1.0	0.3250	0.0	1.325	1.0
Hawaiian Coot	3.0	6.0	0.675	0.0	3.675	6.0
Hawaiian Duck	1.0	0.0	0.2	0.0	1.20	0.0
Hawaiian Stilt	1.0	0.0	0.27	0.0	1.27	0.0

Note 1: Hawaiian Moorhen: The Draft Revised Recovery Plan for Hawaiian Waterbirds, 2nd Draft of 2nd Revision (USFWS 2005c) indicates that average number of fledglings produced per pair is 1.3 per year. The nesting season (March to August) constitutes 50% of the calendar year. An adult killed during the breeding season will be assumed to have been breeding. Males and females care for their young fairly equally. Consequently, the amount of potential indirect take is calculated as follows:

Fledglings per pair (1.3) x likelihood of mortality during breeding season (0.5) x likelihood of breeding (1.0) x parental contribution (0.5) = 0.325.

Note 2: Hawaiian Coot: The Draft Revised Recovery Plan for Hawaiian Waterbirds, 2nd Draft of 2nd Revision (USFWS 2005c) indicates that average number of fledglings produced per pair per year is 0.9. The nesting season (concentrated from March to August, though can occur other times of the year) constitutes 50% of the calendar year. An adult killed during the breeding season will be assumed to have been breeding. Males and females care for their young fairly equally. Consequently, the amount of potential indirect take is calculated as follows:

Fledglings per pair (0.9) x likelihood of mortality during breeding season (0.5) x likelihood of breeding (1.0) x parental contribution (0.5) = 0.225.

Note 3: Hawaiian Duck: The Draft Revised Recovery Plan for Hawaiian Waterbirds, 2nd Draft of 2nd Revision (USFWS 2005c) indicates that average number of fledglings produced per pair per year is 1.225. The nesting season (March to June) constitutes 33% of the calendar year. An adult killed during the breeding season will be assumed to have been breeding. Since males do not provide any parental care for eggs or ducklings, the "parental contribution" factor for males would be zero, while the factor for females would be 1.0, so the average parental contribution value is 0.5. Consequently, the amount of potential indirect take is calculated as follows:

Fledglings per pair (1.225) x likelihood of mortality during breeding season (0.33) x likelihood of breeding (1.0) = 0.40; 50% of that value (to account for males providing no parental care, thus an indirect effect would only occur if a female is killed during the breeding season, and for calculation purposes the on-site population is assumed to be equally divided between males and females) results in an indirect take factor of 0.20.

Note 4: Hawaiian Stilt: The Draft Revised Recovery Plan for Hawaiian Waterbirds, 2nd Draft of 2nd Revision (USFWS 2005c) indicates that average number of fledglings produced per pair per year is 0.9. The nesting season (February to August) constitutes approximately 60% of the calendar year. An adult killed during the breeding season will be assumed to have been breeding. Males and females care for their young fairly equally. Consequently, the amount of potential indirect take is calculated as follows:

Fledglings per pair (0.9) x likelihood of mortality occurring during breeding season (0.60) x likelihood of breeding (1.0) x parental contribution (0.5) = 0.27

Note 5: To date Kauai Lagoons has not encountered an *injured* Nēnē resulting in an indirect take of eggs or goslings.

4.6.1.2.3 Effects of Avoidance, Minimization, and Mitigation Measures on Listed Waterbird Species

As described previously, KL would implement a suite of measures to avoid and minimize impacts to the four listed waterbird species. These are the same measures described in Section 4.6.1.1.3 for Nēnē, and implementation of these measures is expected to be similarly effective at minimizing impacts to the waterbird species.

As with Nēnē, however, the potential for take of these waterbird species cannot be eliminated. To mitigate for such impacts, KL would maintain the approximately 35 acres of lagoons and their surrounding habitats on the property, which have attracted and do support these species. This provides a benefit to all four waterbird species, and a particularly important benefit to Hawaiian Coots that appear to spend much of the year on Ni'ihau but then move to KL during the dry season when ephemeral surface waters on Ni'ihau dry up. KL's predator control program would also benefit the four waterbird species. As detailed in Section 4.4.2 of the HCP, the USFWS, DOFAW and outside researchers have long recognized that predation by cats and rats constitutes a significant threat to all of the four waterbird species. In its draft Recovery Plan for Hawaiian Waterbirds, the USFWS identifies the control of rats, cats and dogs as a "Priority 1" recovery action. The KL predator control program will cover a portion of the waterbirds' breeding season.

4.6.1.3 Effects on Covered Seabirds

This section (see Table 4.6) assesses the potential impact of the Covered Activities on the three Covered Seabird Species (Hawaiian Petrel, Newell's Shearwater and Band-rumped Storm-Petrel) in the HCP. There is no suitable nesting or feeding habitat on the KL property for any of the seabird species for which KL is seeking coverage. Hence, there is no potential for construction or operation activities to harm these species directly. However, information gathered by the Save Our Shearwater Program and avian radar studies in the vicinity indicate that these species fly over the KL complex during the breeding season. To-date one Newell's shearwater has been found downed on the property. As new buildings are constructed and occupied, the likelihood increases that the resort lighting will attract seabirds and that seabird fallout will occur.

To offset unavoidable take of listed seabird species, KL would make an annual financial contribution to the mitigation program being created by the Kauai Seabird HCP (KSHCP) (final amount per bird to be determined through the final KSHCP. The contributions would start when construction of Phase 1 of the timeshare units is complete, anticipated to be 2014.

Table 4.6 Estimated Effects on Seabirds.

Activity	*Take (avg. Mortality and Non-Lethal Injury per year)*	*Indirect Take (avg. Mortality and Non-Lethal Injury per year)*	*Total Take (avg. Mortality and Non-Lethal Injury per year)*
CONSTRUCTION PERIOD	0	0	0
OPERATIONAL PERIOD			
Newell's Shearwater	3.0	0.0	3.0
Hawaiian Petrel	<1.0	0.0	<1.0
Band-rumped Storm-Petrel	<1.0	0.0	<1.0

4.6.1.3.1 Effects of Construction Activities on Covered Seabirds

The principal threat that KL poses to the covered seabird species is fallout induced by nighttime illumination that may disorient birds flying through the airspace above the resort. As no nighttime

construction would occur within this development, it is not expected that new construction activities would result in any impacts to any of the seabird species.

4.6.1.3.2 Effects of Operations on Covered Seabirds

As newly constructed structures are occupied within the resort development in the future, the potential that lighting associated with the buildings could attract nocturnally flying seabirds and that a small proportion of birds over-flying the site, therefore, could fallout, would increase. As described in more detail below, lighting at KL would be designed to reduce the potential for direct impacts to seabirds. These estimates assume KL's ongoing implementation of the following proposed minimization and mitigation measures:

- KL development and implementation of an endangered seabird awareness program similar to those implemented elsewhere on the Island.
- Attendance of all resort personnel at a seabird awareness training session.
- Daily monitoring of the grounds and buildings for downed seabirds during the seabird fallout season.
- Attendance of all Department of Safety and Security personnel at seabird handling workshop and their maintenance of a detailed log of all seabirds recovered, with location, condition, time of day, and other pertinent information recorded.
- DOFAW's placement of a Save Our Shearwater Aid Station on-site during the fallout season each year.
- KL's maintenance of a pet carrier on site at all times and the use of that carrier to temporarily hold any downed seabird recovered at KL.

Given the lighting-specific avoidance and minimization measures described above, as well as the relatively smaller light attraction potential of the new resort buildings relative to other nearby light sources, it is estimated that upon completion of the new construction, annual take of seabirds may occur at the average annual rate of three mortalities and non-lethal injuries for Newell's Shearwaters, and <1 mortality or non-lethal injury for Hawaiian Petrel and Band-rumped Storm Petrel.

Newell's Shearwater, Hawaiian Petrel and Band-rumped Storm-Petrel: Approximately 97% of these seabirds which fallout on Kaua'i due to light attraction and are retrieved by the Save Our Shearwater program are fledglings, which do not have dependent young. Adults, which may have dependent young, are at risk of fallout due to collisions with power lines, guy wires, and poles, none of which are associated with KL's construction or operation activities. It is therefore assumed that any light-attraction take of seabirds which might occur at the resort in the future would be fledgling fallout, and there would be no indirect impact in the form of loss of dependent young.

As indicated in the right-hand columns of Table 4.6, combining all of the above components of effect on seabirds results in total estimated take of 3.0 Newell's Shearwater per year. The total estimated take of the other two listed seabirds one Hawaiian Petrel and one Band-rumped storm petrel over the 30 year life of the permit.

4.6.1.3.3 Effects of Avoidance, Minimization and Mitigation Measures

To avoid and minimize potential light attraction impacts of both new buildings and existing facilities, KL would implement a suite of measures detailed in the HCP. These include the use of only shielded lights, cut-off luminaries, or indirect lighting for exterior lighting purposes, thereby minimizing the amount of light which projects upward and would thus be visible to overflying seabirds. Similarly, it would refrain from the use of upward-pointing spotlights, or spotlighting of structures and landscaping. Post-construction, completed buildings would be inspected after dark by a qualified biologist to determine if any modifications are needed to lighting fixtures, bulbs, lighting direction, or shielding to ensure that potential light attraction has been minimized to the maximum extent practicable. KL has already implemented this approach at the Kalanipu'u building (which became

ready for occupancy in 2009), and on adjacent grounds and other areas of the KL property. These measures are consistent with the best management practices routinely recommended by the USFWS and DOFAW for minimizing potential light attraction to seabirds on Kaua'i.

Despite the implementation of such measures, it is not possible to eliminate potential light attraction by newly constructed facilities entirely. Consequently, to mitigate unavoidable take of listed seabird species, KL would make an annual financial contribution to the island-wide mitigation program being created by the Kaua'i Seabird HCP (KSHCP) (final amount per bird to be determined through the final KSHCP). The contributions would start when construction of Phase 1 of the timeshare units is complete, anticipated to be 2014. The KSHCP intends to pool mitigation payments from numerous participants, and utilize those funds to perform habitat management and predator control work in several seabird breeding colonies on Kaua'i in order to improve breeding success. The USFWS and DOFAW expect that the KSHCP will be finalized and approved by late 2011 or 2012, well in advance of KL's contribution start date of 2014.

4.6.1.4 Summary of Effects on Covered Avian Fauna

In summary, KL expects that the Covered Activities, coupled with implementation of the avoidance and minimization measures described in the HCP, will result in the incidental take of avian species shown in the following impacts:

Table 4.7. Summary of Incidental Take of All Covered Avian Species.

Species	Average Annual Incidental Take			Take over 30-Year Permit Term
	Direct	Indirect	Total	
Nēnē	2.5 mortality	0.9 mortality	3.4 mortality	102 mortality
	4 non-lethal injuries	0.0 non-lethal	4.0 non-lethal	120 non-lethal
Hawaiian Moorhen	1 mortality	0.325 mortality	1.325 mortality	40 mortality
	1 non-lethal injury	0.0 non-lethal	1.0 non-lethal	30 non-lethal
Hawaiian Coot	3 mortality	0.675 mortality	3.675 mortality	110 mortality
	6 non-lethal injuries	0.0 non-lethal	6.0 non-lethal	180 non-lethal
Hawaiian Duck	1 mortality or non-lethal injury	0.2 mortality or non-lethal	1.20 mortality or non-lethal	36 mortality or non-lethal
Hawaiian Stilt	1 mortality or non-lethal injury	0.27 mortality or non-lethal	1.27 mortality or non-lethal	38 mortality or non-lethal
Newell's Shearwater	3.0 mortality and non-lethal injury	0.0	3.0 mortality and non-lethal injury	90 mortality and non-lethal injury
Hawaiian Petrel	<1 mortality and non-lethal injury	0.0	<1.0 mortality and non-lethal	1 mortality and non-lethal
Band-rumped Storm-Petrel	<1 mortality and non-lethal injury	0.0	<1.0 mortality and non-lethal	1 mortality and non-lethal

4.6.2 NO ACTION ALTERNATIVE

Under the no action alternative, KL would continue to operate KL and its existing facilities, without the measures provided in this HCP. This alternative was not selected because (1) take of Covered Species may occur as a result of ongoing and necessary resort operations (e.g., grounds management and maintenance, golf operations), but would neither be minimized, mitigated, nor authorized; and (2) the new construction activities are required for the continued financial viability of the resort. This alternative would not provide funding to assist with developing a Nēnē management plan to address the existing, and increasing, risk that resident Nēnē pose to aircraft safety at the adjacent Līhu'e International Airport.

4.7 IMPACTS ON FLORA

4.7.1 PROPOSED ACTION ALTERNATIVE

4.7.1.1 HCP Conservation Measures Effects on Flora

None of the HCP measures listed in Table 4.1 or Table 4.2 involves activities that would directly affect flora in any meaningful way. They do not require ground clearing, the planting of vegetation, or other activities that might alter the microclimate in ways that could favor one type of plant over others.

4.7.1.2 Construction, Operations and Maintenance Effects on Flora

Construction of the resort and related facilities that are part of KL's plans would alter the existing flora due to ground clearing and the replacement of existing vegetation with golf course and landscape species. Vegetation in areas of the existing golf course that would be disturbed consists of non-native turf grass and ornamental plants and trees such as fig, silk oak, and ironwood. The resort portion of the property is similarly landscaped, with the inclusion of a greater variety of ornamental flowers and shrubs such as heliconia (sp.), white ginger, and mango. No state or federally listed threatened, endangered, or candidate plant species have been documented on-site (David, 2005). Due to the general condition of the habitat and the specific lack of any environmentally sensitive native plant species on the project site, the proposed KL project is not expected to result in any significant adverse impact on botanical resources in this part of Kaua'i.

4.7.2 NO ACTION ALTERNATIVE

No change in existing floristic conditions would occur in the project area under this alternative because the planned resort and golf facilities would not be constructed or operated.

4.8 IMPACTS ON HISTORIC, ARCHAEOLOGICAL, & CULTURAL RESOURCES

4.8.1 PROPOSED ACTION ALTERNATIVE

None of the HCP measures listed in Table 4.1 or Table 4.2 involves activities that have the potential to affect historic, archaeological, or cultural resources in any meaningful or deleterious way. While KL's development of the project site involves grading and other activities there are no known historic, archaeological, and cultural resources at KL (see Section 3.4.5).

In the unanticipated event that any archaeological sites, significant cultural deposits, or human skeletal remains are found during construction activities of the proposed Project, all work would immediately cease pending consultation with the SHPD. As a precautionary measure, personnel involved in KL's development activities would be informed of the possibility of inadvertent cultural finds, and made aware of the appropriate notification measures to follow, including consultation with the SHPD and, as may be appropriate, with Kaua'i community cultural organizations. The treatment

of any remains or artifacts would be in accordance with procedures obtained by the Kauai/Niihau Islands Burial Council and the SHPD.

4.8.2 NO ACTION ALTERNATIVE

No impacts to historic, archaeological, and cultural resources would occur under the No Action Alternative because the planned resort and golf facilities would not be constructed or operated in the project area.

4.9 SCENIC RESOURCES

4.9.1 PROPOSED ACTION ALTERNATIVE

The Kauaʻi County General Plan notes that the island is known for the beauty and the great variety of its landscape and that the native Hawaiian culture is intimately linked to physical places, many of which have a special significance in relation to a particular god, legend, song, or historical occurrence. To establish the type and locations of points of particular scenic value, the General Plan sets forth maps documenting heritage resources. The Līhuʻe Planning District Heritage Resource Map does not identify any site of scenic value within the project area. The nearest scenic site of interest located on the Heritage Map is the Nāwiliwili Harbor Light House on Ninini Point. Because of its resort nature, the facilities that make up KL's proposed action are designed to enhance the aesthetic value of the land and do not detract from any sites identified in the heritage resource maps contained in the Kauaʻi General Plan or any other major scenic byway or corridor.

4.9.2 NO ACTION ALTERNATIVE

No impacts to existing scenic resources would occur under the No Action Alternative because the planned resort and golf facilities would not be constructed or operated in the project area.

4.10 HAZARDOUS SUBSTANCES & MATERIALS

4.10.1 PROPOSED ACTION ALTERNATIVE

4.10.1.1 Impacts of Proposed HCP Conservation Measures on Presence/Use of Hazardous Materials

The conservation measures that are proposed as part of the HCP do not involve the use of hazardous substances and materials.

4.10.1.2 Impacts of Proposed Construction, Operation and Maintenance on Presence/Use of Hazardous Materials

During the construction phase of the improvements that KL has proposed, small amounts of several hazardous materials that require special handling and storage will be transported, used, and stored on-site. These may include such materials as waste aerosols, gel-cell batteries, fuel, combustible liquid materials, chemicals, and paint. Risks of harm would be minimized by requiring contractors to comply with all applicable statutes, ordinances and regulations, and to follow BMPs including proper containment of staging and stockpiling areas, provision of spill kits, regular waste collection and disposal, frequent equipment inspection, and off-site refueling and vehicle washing at an approved location.

Routine operation and maintenance of the proposed resort and golf facilities would involve the use of several materials that require special handling including common lubricants, petroleum products, pesticides or other chemical products. Ongoing maintenance of the golf course and landscaping also entails the use of certain chemicals. When stored and applied as labeled (i.e., in accordance with U.S. Environmental Protection Agency, U.S. Occupational Safety and Health Administration (OSHA), and

State of Hawai‘i regulations), these materials do not pose an undue environmental or health risk. To minimize risks from these sources, storage of containerized chemical products used for maintenance of the existing and proposed facilities would be limited, incidental, and contained to the on-site central operations building. Bulk quantities of petroleum products, pesticides, herbicides, fertilizer, or other products would not be stored on-site.

Vegetation in the project area is likely to be controlled using mechanical methods; however, in the event that herbicides are used on-site, only herbicides that are registered with the EPA will be used. All herbicide applications would be carried out by licensed applicators in accordance with approved procedures and product labels.

4.10.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, there would be no construction-related change from existing conditions because the proposed new resort and golf facilities would not be constructed or operated in the project area. However, existing uses of hazardous materials (which account for the bulk of possible long-term uses of these substances) would continue.

4.11 LAND USE

4.11.1 PROPOSED ACTION ALTERNATIVE

4.11.1.1 Impacts of Proposed HCP Conservation Measures on Land Use

The measures that would be implemented if the HCP is approved are related to existing uses of the area. Their implementation is consistent with the ongoing use of the resort property.

As discussed in detail above, the growth of the Nēnē population at the resort has become an issue for flight operations at the adjacent Līhu‘e International Airport. Measures included in the HCP are intended to maintain the existing habitat value at the site (and, therefore, the abundance of the Covered Species), and facilitate the translocation of Nēnē by DOFAW or USFWS to other locations, and ultimately reduce the population of Nēnē at the resort. This would reduce risks to airport operations and allow for other available conservation sites to be managed to offset reduced nesting at KL.

4.11.1.2 Impacts of Construction, Operation and Maintenance on Land Use

Additional resort development will occur if the permit is issued and KL proceeds with its proposed improvements. The proposed facility would be located on private land in an area already devoted to resort and golf operations and adjacent to existing transportation infrastructure and commercial resort facilities. The presence of the resort buildings, golf course, and related facilities would not limit access to other land served by the existing access road. The presence of the proposed facilities would not interfere with continuing use of the adjacent coastline. The proposed KL facilities would be visible from other areas, however, none of these areas are proposed for land uses that might be particularly sensitive to the presence of the golf course or resort facilities. Therefore, the Proposed Action is not expected to result in significant impacts to any existing or likely future land uses.

4.11.2 NO ACTION ALTERNATIVE

No impacts on surrounding land use would occur under the No Action Alternative because the planned resort and golf facilities would not be constructed or operated in the project area.

Table 4.8 Summary of Resource Impacts.

Resource	Impact of No Action	Impact of Proposed Action
Topography	As the No-Action Alternative does not entail land alteration from either construction or ongoing operations, there would be no effect on topography.	HCP Conservation Measure Impacts: The proposed conservation measures do not involve changes in topography. Construction of New and Operation of Existing and New Facilities: Grading for the new resort facilities will cause minor alterations of local topography, but would not alter major topographic features. Ongoing operations will not affect topography.
Geology, Soils, and Geologic Hazards	As the No-Action Alternative does not entail activities from either construction or ongoing operations that would affect geologic or soils resources, it would have no effect.	HCP Conservation Measure Impacts: None of the HCP conservation measures involve activities with the potential to affect soils or to increase the risk to geologic hazards. Construction of New and Operation of Existing and New Facilities: Construction of the proposed new resort features would not alter any important geologic resources or increase exposure to geologic hazards (e.g., earthquakes, lava flows, etc.). The area that would be altered by new construction has soil with high agricultural productivity rating.
Hydrology and Water Resources	As the No-Action Alternative does not entail any changes in stormwater runoff, water use, or other hydrologic factors, it would have no measurable effect on these resources. They will continue to be affected by ongoing operation of the existing resort facilities, however.	HCP Conservation Measure Impacts: None of the HCP conservation measures involve activities (e.g., use of potable water, discharge of water or stormwater, re-routing of drainage, etc.) with the potential to affect hydrology or water resources. Construction of New and Operation of Existing and New Facilities: Construction of the proposed new resort features would result in a minimal increase in impervious surfaces and would not, therefore, alter the volume of runoff or groundwater recharge. It would produce small changes in the routing of the runoff, but would not change the balance or general location of flows into the ocean or internal water bodies. Ground disturbance associated with construction has the potential to change temporarily the quality of runoff from construction areas. KL is using Best Management Practices (BMPs) and obtaining construction stormwater permits (NPDES NOI-C approvals) from the State of Hawai'i Department of Health, thereby minimizing the extent of these temporary impacts. Operation of the additional resort facilities does not involve the release of additional water pollutants.

Resource	Impact of No Action	Impact of Proposed Action
Air Quality	The No-Action Alternative does not entail additional construction, thereby eliminating additional sources of air pollution. However, as existing uses of the area would continue and they account for the great majority of the air pollutants now present, the reduction would not be significant.	HCP Conservation Measure Impacts: None of the HCP conservation measures involve the discharge of air pollutants or the construction and operation of facilities that are significant emitters of air pollutants. Neither do they have the potential to alter airflow in a way that could lead to decreased air quality in localized areas. Construction of New and Operation of Existing and New Facilities: Equipment used to construct the proposed new resort features will be powered by internal combustion engines that would produce low-level emissions of hydrocarbons (HC), fugitive dust (PM10), CO, NO_x, SO_2, and CO_2 and other air pollutants. Similarly low levels of emissions will result from the use of vehicles used by resort guests and employees. Use of construction BMPs will control fugitive dust from construction areas, and the completed facilities are well landscaped and watered, thereby minimizing fugitive dust post-construction. The relatively low level of vehicular use and the high level-of-service provided by area roadways mean that these would not have a significant effect on air quality.
Sound Levels	No Action would avoid the temporary construction noise that would result from the proposed action.	HCP Conservation Measure Impacts: None of the HCP conservation measures involve activities with the potential to alter sound levels significantly. In fact, the habitat management measures are more likely to ensure lower ambient sound levels than would otherwise be the case (e.g., speed limits on roads and restrictions on pets). Construction of New and Operation of Existing and New Facilities: Construction noise from excavators, trucks, and other heavy equipment would occur while new resort facilities are being constructed. However, the area within which the work will occur is limited and generally separate from other noise-sensitive development. Noise would comply with the State of Hawai'i noise limits established in HAR 11-46. Consequently, it would not have a significant adverse effect on the community. The most significant sound source in the area would continue to be aircraft operating from the nearby Līhu'e Airport.

Resource	Impact of No Action	Impact of Proposed Action
Fauna	Without the minimization and mitigation measures provided in the HCP (e.g., speed limits, employee and user education, predator control), more take would occur as compared to the Proposed Action, and Nēnē and waterbird breeding success on the property would be reduced as compared to the Proposed Action. This would adversely affect statewide recovery efforts, since the KL Nēnē flock is the most prolific breeding population in the state. Under the Governor's Proclamation, DOFAW would be required to develop and implement a Nēnē Action Plan. Although the take of listed seabirds would be reduced under the no action alternative relative to the proposed action, some take may still occur as a result of existing lights and building infrastructure.	HCP Conservation Measure Impacts: The Conservation Measures (e.g., speed limits on area roadways, employee and user education, and predator control) that will be implemented are designed specifically to benefit the endangered species that use the property. That benefit would be achieved, in part, by control measures aimed at predators such as rats and feral cats, whose populations would decline when the HCP is implemented. In addition, funding the preparation of a draft Nēnē Management Plan (one of the proposed measures in the HCP) would facilitate statewide management and recovery of the species by the agencies. The plan would also address ongoing concerns regarding the risk that the increasing Nēnē population poses to human safety at Lihue Airport. Payment toward the KSHCP would assist in the management and recovery of listed seabirds. Construction of New and Operation of Existing and New Facilities: Incidental take of federally listed species may occur due to construction and ongoing golf operations. This document (as well as the HCP) describes measures that will be implemented to avoid, minimize, and mitigate take, which will result in a net conservation benefit to the Covered Species. Take of adult Nēnē and waterbirds resulting from the proposed action may result in the indirect take of dependent eggs and chicks. The new construction, when complete, would increase the overall lighting at KL, increasing the potential for take of listed seabirds.
Flora	The No Action alternative would avoid the small reduction in vegetated area that would result from the proposed action. However, as most of the species present are common non-native species, none of which are rare or endangered, the retention of the scrub vegetation would not be significant.	HCP Conservation Measure Impacts: None of the HCP conservation measures involve activities with the potential to affect flora. Construction of New and Operation of Existing and New Facilities: Construction of the proposed new resort features involves grubbing that reduces the amount of scrub vegetation now present on the areas where the proposed resort units would be developed. No sensitive or endangered plants occur in the areas to be directly affected by construction. The project includes a plan for immediate and long-term revegetation/ restoration, as well as invasive species prevention and control.

Resource	Impact of No Action	Impact of Proposed Action
Historical, Archaeological, and Cultural Resources	If the activities outlined in the HCP are not implemented, there is no potential for effects on historical, cultural, or archaeological resources.	HCP Conservation Measure Impacts: Because there are no known historic, archaeological, and cultural resources (including burials) at KL, none of the HCP conservation measures involve activities with the potential to affect these resources in any meaningful or deleterious way. Construction of New and Operation of Existing and New Facilities: While KL's development of the project site involves grading and other land disturbance, the absence of known historic, archaeological, and cultural resources minimizes the likelihood of adverse effect. In the unanticipated event that any archaeological sites, significant cultural deposits, or human skeletal remains are found during construction activities of the proposed Project, all work will immediately cease pending consultation with the SHPD. As a precautionary measure, personnel involved in KL's development activities will be informed of the possibility of inadvertent cultural finds, and made aware of the appropriate notification measures to follow, including consultation with the SHPD and, as may be appropriate, with Kaua'i community cultural organizations. The treatment of any remains or artifacts would be in accordance with procedures obtained by the Kaua'i/Ni'ihau Islands Burial Council and the SHPD.
Scenic Resources	If the facility is not constructed and operated, there would be no change in existing conditions and no impacts to scenic resources.	HCP Conservation Measure Impacts: None of the HCP conservation measures involve activities with the potential to affect scenic resources. Construction of New and Operation of Existing and New Facilities: Construction of the proposed new resort features involves the erection of new structures. The Līhu'e Planning District Heritage Resource Map does not identify any site of scenic value within the project area. The nearest scenic site of interest located on the Heritage Map is the Nāwiliwili Harbor Light House on Ninini Point. Because of its resort nature, the facilities that make up the Applicant's proposed action are designed to enhance the aesthetic value of the land and do not detract from any sites identified in the heritage resource maps contained in the Kaua'i General Plan or any other major scenic byway or corridor.

Resource	Impact of No Action	Impact of Proposed Action
Hazardous Substances and Materials	Selection of the No Action alternative would eliminate the potential for release of contaminants from construction activities. Impacts resulting from ongoing resort operations would remain constant.	HCP Conservation Measure Impacts: None of the HCP conservation measures involve the use of hazardous substances and materials. Construction of New and Operation of Existing and New Facilities: Construction of the proposed new resort features would involve the use of small amounts of several hazardous materials that require special handling and storage (e.g., waste aerosols, gel-cell batteries, fuel, combustible liquid materials, chemicals, and paint). Routine operation and maintenance of the proposed resort and golf facilities will also involve the use of several materials that require special handling including common lubricants, petroleum products, pesticides or other chemical products. Ongoing maintenance of the golf course and landscaping also entails the use of certain chemicals. Risks of harm would be minimized by requiring contractors to comply with all applicable statutes, EPA labels and uses, ordinances and regulations, and to follow BMPs including proper containment of staging and stockpiling areas, provision of spill kits, regular waste collection and disposal, frequent equipment inspection, and off-site refueling and vehicle washing at an approved location.
Land Use	The No Action alternative means that the proposed addition to the KL project would not occur. Existing land uses (both vacant land and resort uses) would remain and would continue to affect the covered species.	HCP Conservation Measure Impacts: None of the HCP conservation measures involve activities with the potential to affect land use except insofar as they enhance the experience of homeowners and resort visitors. Construction of New and Operation of Existing and New Facilities: Additional resort development would occur if the permit is issued and the applicant proceeds with its proposed improvements. The proposed facility would be located on private land in an area already devoted to resort and golf operations and adjacent to existing transportation infrastructure and commercial resort facilities. The presence of the resort buildings, golf course, and related facilities would not limit access to other land served by the existing access road. Neither are they expected to make other development either more or less likely to occur.
Other Effects	The No Action Alternative foregoes the construction jobs, business activity, and government revenues that would be generated by construction of the proposed facilities.	HCP Conservation Measure Impacts: The HCP conservation measures involve activities that generate a modest amount of economic activity or employment or have other with the Construction of New and Operation of Existing and New Facilities: Direct socio-economic effects of the proposed resort facilities include: (1) construction employment and business activity; (2) ongoing employment of facility staff (which will be relatively limited); and (3) ongoing expenditures for materials and outside services. No disproportionate adverse health or environmental impacts would occur to any low-income or minority population. Existing and/or planned public infrastructure and public services have the capacity to accommodate the approved resort expansion. The activities that KL proposes to carry out in order to implement the measures

		provided for in the HCP are consistent with all federal, state, and local environmental and land use plans and controls.

4.12 CONSISTENCY WITH ENVIRONMENTAL AND LAND USE POLICIES

The activities that KL proposes to carry out in order to implement the measures provided for in the HCP are consistent with all Federal, state, and local environmental and land use plans and controls. The activities that would be indirectly facilitated by approval of the HCP and issuance of the requested ITP are consistent with these as well. More specific information about each of these is presented below.

4.12.1 FEDERAL POLICIES AND REGULATIONS

4.12.1.1 Federal Endangered Species Act

See Sections 1.2.2, 2.2.3, and 4.6.1 for discussion.

4.12.1.2 Federal Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) of 1918, as amended (16 USC 703-712), prohibits the take of migratory birds. A list of birds protected under MBTA implementing regulations is provided at 50 CFR 10.13. Unless permitted by regulations, under the MBTA it is unlawful to pursue, hunt, take, capture or kill; attempt to take, capture or kill; possess, offer to or sell, barter, purchase, deliver or cause to be shipped, exported, imported, transported, carried or received any migratory bird, part, nest, egg or product. The MBTA provides no process for authorizing incidental take of MBTA protected birds. All bird species covered by this HCP are also protected under the MBTA. Because the MBTA provides for no incidental take authorization, other MBTA-listed birds that are not protected by the ESA and that may be adversely affected by the activities that KL has proposed will not be covered by any take authorization.

4.12.1.3 Federal National Historic Preservation Act

The proposed project is compatible with this Act. See Section 1.2.4, Section 3.4.5, and Section 4.8.

4.12.1.4 Executive Order 12898 - Environmental Justice

Executive Order 12898 requires Federal agencies to take appropriate steps to identify and avoid disproportionately high and adverse effects of Federal actions on the health and surrounding environment of minority and low-income persons and populations. The U.S. Environmental Protection Agency, working with the Enforcement Subcommittee of the National Environmental Justice Advisory Council, has developed technical guidance to ensure that environmental justice concerns are effectively identified and addressed throughout the NEPA process. Suggested measures include identifying areas as low-income if more than 20% of the affected area is below the poverty level (as defined by the U.S. Census Bureau) or identifying areas as minority areas if minority populations represent more than 15.72% of the total population. Typically, minorities are defined as individuals who are members of the following population groups: African Americans, American Indians, Alaskan Natives, Asians, Hispanics, Native Hawaiians, or Other Pacific Islanders.

As recognized in the Hawai‘i Environmental Justice Initiative Report (Kahihikolo 2008), the minority population distribution of Hawai‘i differs greatly from that of the continental U.S. In contrast to the continental U.S., where Caucasians account for the majority of the population, no racial group in Hawai‘i comprises even as much as half of the state population (OMPO and DPP 2004). The state is also unique in that 21.4% of the population reported multiple races; only 2.4 did so in the continental U.S. Thus, the minority definitions developed to determine environmental justice impacts on the mainland U.S. may not be applicable or appropriate for Hawai‘i (OMPO and DPP 2004). For this

reason, the State of Hawaiʻi has also developed its own legislation and guidance related to environmental justice. Act 294 was signed by Governor Lingle in July 2006 to define environmental justice in the unique context of Hawaiʻi and to develop and adopt environmental justice guidance document that addresses environmental justice in all phases of the environmental review process (Kahihikolo 2008).

The Līhuʻe CDP population is racially similar to that of the state as a whole. At 28.2%, Japanese made up the largest single group when the 2000 census was taken. This was followed by white (22%), mixed-race (20.5%), Filipino (14.8%), and native Hawaiian (5.7%) (Table DP-1 for Līhuʻe CDP, US Census Bureau 2000). A relatively low number were below the poverty line (1.7% of families, 9.6% of families with female head/no husband present), and 4.6% of individuals (Table DP-3, US Census Bureau 2000). These data indicate that there are no concentrations of low income or minority populations in the vicinity of the project area.

The proposed project is not expected to result in significant environmental, human health, or economic impacts on surrounding populations. No persons or populations will be displaced as a result of this project. Furthermore, since the Proposed Action would benefit the local economy, including the low number of low-income persons in Līhuʻe, these individuals will not experience a disproportionate share of the impacts of the project. Therefore, the proposed project complies with Executive Order 12898.

4.12.2 STATE POLICIES AND REGULATIONS

4.12.2.1 Hawaii State Plan (Chapter 226, Hawai'i Revised Statutes)

Section §226-11 of the Hawaiʻi State Plan establishes objectives and policies for the physical environment--land-based, shoreline, and marine resources. It sets several objectives related to planning with regard to land-based, shoreline, and marine resources. The following are among these:

(1) Prudent use of Hawaii's land-based, shoreline, and marine resources.

(2) Effective protection of Hawaii's unique and fragile environmental resources.

In order to achieve these objectives, it makes it the policy of the State to:

(1) Exercise an overall conservation ethic in the use of Hawaii's natural resources.

(2) Ensure compatibility between land-based and water-based activities and natural resources and ecological systems.

(3) Take into account the physical attributes of areas when planning and designing activities and facilities.

(4) Manage natural resources and environs to encourage their beneficial and multiple use without generating costly or irreparable environmental damage.

(5) Consider multiple uses in watershed areas, provided such uses do not detrimentally affect water quality and recharge functions.

(6) Encourage the protection of rare or endangered plant and animal species and habitats native to Hawaii.

(7) Provide public incentives that encourage private actions to protect significant natural resources from degradation or unnecessary depletion.

(8) Pursue compatible relationships among activities, facilities, and natural resources.

The measures that are included in the proposed HCP are targeted specifically at §226-11.b. (6), the policy relating to rare and endangered species. Implementation of these measures would improve the viability of the targeted species.

In addition to this direct and intended effect, the proposed action will allow KL to remain competitive as a golf and resort destination and has the associated environmental and economic benefit of providing attractive habitat for native birds. The proposed golf, resort, and related facilities would enhance KL's commercial viability as well as its ability to manage its population of native birds effectively. Consequently, it is consistent with these objectives.

4.12.2.2 Hawai‘i Revised Statutes, Chapter 195D

Kaua‘i Lagoons is currently seeking an ITL as provided under Chapter 195D, Hawai‘i Revised Statutes. Its application is based on the same HCP as addressed in this document. Therefore, the project is compliant with this statute.

4.12.2.3 Hawai‘i Revised Statutes, Chapter 343

As indicated in Section 1.3.1, approval of the ITL is not subject to HRS Chapter 343. Some of the land use approvals related to the surrounding resort development did involve preparation of Chapter 343 documentation for portions of the subject property, and the last of those was completed in 2009.

4.12.2.4 State Coastal Zone Management Program

As indicated in Section 1.3.4, the area that is covered by the HCP is within the State of Hawai'i's Coastal Zone Management Area. Projects that are within the CZM Area and that require a Federal permit or license (such as an Incidental Take Permit) are subject to review for consistency with the CZM Program. A comparison of the relationship of all HCP-related measures with all of the applicable CZM goals and objectives, shows that:

- The habitat protection and improvement measures that would be implemented if the HCP is approved and the take authorizations are issued do not involve work that would be exposed to coastal hazards or affect coastal processes.
- The resort and facilities that would be allowed if the HCP is approved and the ITP is issued, is located, designed, and constructed to minimize adverse social, visual, and environmental impacts in the coastal zone management area; and
- It does not involve the placement, erection, or removal of materials near the coastline.

4.12.2.5 Kaua‘i County General Plan

The Kauai County General Plan makes it County policy to document and protect natural resources, including Covered Species of the HCP and their habitat. The measures that would be implemented under the HCP would contribute to the achievement of those objectives without compromising the many other economic, social, and planning goals which the General Plan seeks to achieve.

4.13 CUMULATIVE IMPACTS

The measures that make up the HCP are not being undertaken in isolation. Instead, they are part of the larger-scale plan to redevelop the KL site and of other activities in and around Līhu‘e. This section considers projects in the past, present, and reasonably foreseeable future, authorized or under review, that are considered to contribute to the cumulative impacts not only on endangered, threatened, and other rare species, but also on society and the human environment. "Cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time" (40 CFR 1508.7). This discussion is limited to those past, present, and reasonably foreseeable future actions that involve impacts on a resource that overlaps with the Proposed Action impacts on that same resource.

As discussed throughout this report, past development is responsible for substantially altering the physical and biologic environment in the project area, including the man-made habitat that supports threatened and endangered species and other non-protected species.

4.13.1 CUMULATIVE IMPACTS OF THE PROPOSED ACTION

4.13.1.1 Cumulative Effects on Climate and Microclimate

The minimization measures and mitigation measures that KL has proposed to implement if the HCP is approved (see Table 4.1and Table 4.2, respectively) do not have the potential to adversely affect temperature, rainfall, humidity, wind regime, or other meteorological parameters. Consequently, they do not have the potential to contribute to climate impacts from other projects or activities in the area.

4.13.1.2 Cumulative Effects on Topography, Geology, and Soils

HCP-related measures do not require grading or other development activities that would alter topography, block access to geologically important materials or features, or preclude the use of high quality agricultural soils. Because the soil on-site has largely been disturbed previously by agricultural and other activities, any disturbance of the soil would not contribute to loss of native soils or add to impacts resulting from other development activities on the regional area. Hence, there is no potential for cumulative effects on these resources.

4.13.1.3 Cumulative Effects on Water Resources

The measures needed to implement the HCP do not require modifications to or alternate uses of existing water resources. They would not substantially increase impervious surfaces or alterations drainage patterns and stormwater runoff pathways. Neither would they affect the quality of stormwater runoff. Hence, there is no potential for them to contribute to cumulative effects on water resources.

The related resort and golf course development and operations that is part of the overall KL master plan does involve minor changes in drainage patterns and grading that could, in the absence of preventative measures, temporarily increase suspended sediment levels in stormwater runoff. BMPs and general construction management techniques designed to minimize erosion will be implemented in accordance with KL's NOI-C permit from the State Department of Health. Moreover, the location of waters into which runoff from the various KL development areas flows are such that there is very little potential for them to be affected by other development.

4.13.1.4 Cumulative Effects on Air Quality

The measures that KL would undertake as part of its proposed HCP involve virtually no activities that have the potential to affect air quality. Hence, they do not have the potential to contribute to cumulative effects.

The related resort and golf course development and operations that are part of the overall KL master plan would contribute very low levels of air emissions to the air in the region during construction, operation, and monitoring of the project. However, the existing air quality is good, the areas where the emissions would occur are well-ventilated, and there are no other nearby large emission sources. As a result, cumulative effect of emissions resulting from this and other projects occurring on the island is not expected to cause a significant change in regional air quality.

4.13.1.5 Cumulative Effects on Sound Levels

The measures that KL would undertake as part of its proposed HCP involve very low sound emissions, none of which would occur close to noise-sensitive uses. Hence, they do not have the potential to contribute to cumulative effects.

Cumulative noise emissions from the related resort and golf course development and operations that are part of the overall KL master plan are also low. Moreover, they are isolated from other existing development and do not have the potential to change sound levels at those locations. Aircraft noise

from the nearby Līhuʻe Airport would continue to be by far the most significant sound source in the region.

4.13.1.6 Cumulative Effects on Flora

The measures that KL would undertake as part of its proposed HCP are designed to maintain the habitat values (including vegetation) that have made the KL site a productive area for all of the species addressed in the HCP. As these are a continuation of existing practices, they do not have the potential to produce cumulative effects on flora.

The resort and golf course development and operations that are part of the overall KL master plan have the same sort of flora as now exists in the area. Hence, they do not have the potential to cause cumulative effects.

4.13.1.7 Cumulative Effects on Wildlife

The measures that KL would undertake as part of its proposed HCP are intended to promote the wildlife values of the area. To the extent that they are successful, they would help offset species declines that have occurred in other areas where development has degraded the value of the habitat for these species.

Other past, present, and future planned actions within and around KL have the potential to impact the populations of Covered Species. These cumulative impacts have been identified for each group of species; (1) Nēnē; (2) Hawaiian waterbirds; and (3) seabirds.

4.13.1.7.1 Cumulative Impacts – Nēnē

Past impacts to Nēnē continue to slow the recovery of the species across the Hawaiian Islands. Current population levels are heavily influenced by historical and current threats, such as predation from introduced species, inadequate nutrition, lack of suitable lowland habitat, and disease. Additionally, the extremely low population documented in the 1950's (estimated at 30 birds in 1952, Smith 1952) makes the current population susceptible to effects from low genetic variation, such as limiting reproductive success and genetic mutations. Human-caused disturbances, such as feeding birds, vehicular traffic, hunting practices and golfing activities contribute to Nēnē mortality and potentially cause behavioral issues that further contribute to Nēnē decline (USFWS 2004).

In Kauaʻi, an estimated 25 Nēnē were released at Kīpū Kai Ranch in 1985. Further releases, beginning in 1991 at various locations, have continually increased the population of Nēnē on the island (USFWS 2004). As Kauaʻi is one of the only main Hawaiian Islands to not have an established population of the invasive mongoose, Nēnē populations on Kauaʻi have thrived, while Nēnē populations on Maui and Hawaiʻi remain dependent on coordinated management efforts and periodic releases from the captive breeding program (A. Marshall 2010, pers. comm.). Kauaʻi is known to be a successful breeding location due to the availability of lowland habitat. On other islands, Nēnē have been limited to high-elevation sites where wet and cooler weather negatively affect the reproductive productivity of breeding pairs (A. Marshall 2010, pers. comm.). The difference in productivity between islands highlights the importance of predator control and conservation of lowland habitats as a means of promoting breeding success. The birds at KL represent approximately 30% of the 850-900 Nēnē on Kauaʻi. Kauaʻi represents nearly 50% of the total wild Nēnē in the main Hawaiian Islands (A. Marshall 2010, pers. comm.). These numbers indicate that the Nēnē at KL, and on Kauaʻi as a whole, are important for the recovery of the species.

Several local planning efforts can also affect Nēnē. For example, new development may occur consistent with the County's Land Use Development Plan. Although details on future development are lacking, additional development in Kauaʻi, particularly in close proximity to KL, is likely to increase the already existing impacts from human development, human disturbance, habitat alteration, etc. Future development might also impact currently undeveloped lands that may be suitable for Nēnē translocation activities.

To address the impact that Nēnē pose to human health and safety at Līhuʻe Airport, FAA, Wildlife Services, and HDOT plan to consult with USFWS and DOFAW to identify ways to sustainably reduce the population at KL. It is likely that the plan will include hazing of Nēnē on both the airport and KL, translocation of Nēnē from KL to new sites both on Kauaʻi and other main Hawaiian islands, and changes to existing habitat in order to reduce the suitability for nesting Nēnē. Additionally, the Governor of Hawaii's Proclamation, signed April 14, 2011, will expedite DOFAW efforts to translocate Nēnē by exempting the KL population from State laws. These future actions could substantially change the dynamics of the Kauaʻi population. Done in conjunction with one another, these actions should reduce the population of Nēnē at KL, but maintain overall population numbers for both Kauaʻi and the main Hawaiian Islands as a whole. These actions may result in changes in Nēnē behavior, movement patterns, sources of nutrition, and Nēnē family groups. The reduction of the population near Līhuʻe Airport will benefit the safety of the people flying into and out of Kauaʻi, and reduce concerns that Nēnē could contribute to airplane damage.

4.13.1.7.2 Cumulative Impacts – Waterbirds

Past impacts to native Hawaiian waterbirds, including the Hawaiian stilt, Hawaiian moorhen, Hawaiian coot, and Hawaiian duck, continue to negatively impact these populations on Kauaʻi and other main Hawaiian Islands. Over time, the loss of essential wetland habitat has limited the area that these species can use to forage and breed. Development in and around wetlands have resulted in the sedimentation and fill of these systems, thus making them unsuitable for some nesting waterbirds (USFWS 2005c). The filling in of marshes for airfields or development has further constrained Hawaiian waterbirds habitat.

The introduction of invasive predators, including feral cats, rats and mongoose, has severely limited the reproductive potential of nesting waterbirds. Non-native cattle egrets and bullfrogs also prey upon waterbird eggs and chicks (USFWS 2005c). Currently Kauaʻi is one of the only islands to have no documented loss by mongoose, although mongoose have been reported in low numbers on the island in recent years.

Hawaiian ducks continue to be threatened through hybridization with non-native mallards. Historically, Kauaʻi retained the highest percentage of pure Hawaiian ducks on the main Hawaiian Islands. However, over time the percentage of hybrids on Kauaʻi has increased, indicating an increase in the feral mallard population. The hybridization of Hawaiian ducks makes it difficult to conduct recovery activities, since birds must be tested to determine their lineage (USFWS 2005c).

The Hanalei National Wildlife Refuge, part of the Kauaʻi National Wildlife Refuge Complex, is currently conducting a study in conjunction with the Oregon State University to study the life history of the Hawaiian duck. One of the purposes of this study is to determine the movement patterns of the ducks between their upland stream habitats and lowland wetlands. It is anticipated that the results of this work will identify new areas to focus conservation and recovery efforts for the Hawaiian duck.

The Hulēʻia National Wildlife Refuge, also part of the Kauaʻi National Wildlife Refuge Complex, is increasing management activities for the benefit of Hawaiian stilts, moorhen, coots and ducks. These actions include increased wetland management and more active predator removal for cattle egrets, bullfrogs and small mammals. Together these efforts should provide a beneficial impact for Hawaiian waterbird species.

4.13.1.7.3 Cumulative Impacts – Seabirds

Past impacts to seabirds continue to contribute to the decline of the Newell's shearwater, the Hawaiian petrel and the band-rumped storm petrel. The introduction of invasive predators, such as rats and feral cats, has significantly contributed to reduced breeding success. Changes in vegetation, caused by non-native plants and introduced ungulates, limit the habitat suitable for burrowing seabirds to nest and raise chicks.

Storms, such as hurricanes and other weather events during the seabird breeding and chick-rearing season, can substantially impact breeding success in the colonies. Additionally, hurricanes have been

documented to change the physical landscape, thus encouraging invasive plant species that out-compete native plants. Lack of breeding success in combination with a change in the suitability of the habitat may cause certain colonies to be abandoned.

Commercial and recreational long-line operations are a known source of mortality for seabird species at sea. While it is unknown what percentage of the Hawaiian populations are affected by long-line fisheries, over time this threat has reduced the number of adults returning to breeding colonies and contributing to the population.

Impacts from past, existing, and future lighting contribute to a high percentage of fallout of newly fledged seabird chicks. The fledglings are attracted to light sources from stadiums, street poles, parking lots, and other sources. Although these fledglings may fall to the ground alive, many birds are then preyed upon by invasive predators or hit by vehicles along roadways. Those birds that are found alive and taken to rehabilitation often survive to be released, but there is little information on what percentage return to nesting colonies as breeding adults. It is possible that a proportion of the birds that fall out and are released experience delayed mortality.

Adult seabirds are less likely to be impacted by existing and future lights. However, when flying between the ocean and mountainous nesting colonies during the breeding season, adult seabirds are at risk of colliding with existing and future structures, such as telephone poles, electric wires, radio towers and guy wires. Birds that collide with structures are likely to experience traumatic injury and not survive. Birds that do fall to the ground alive are still at risk of predation or being hit by a vehicle. Artificial lighting may also impact the suitability of historic colonies as nesting sites.

Kaua'i Island Utility Cooperative (KIUC) is the operator of the majority of the existing and future public street lights on the island of Kaua'i. As these lights have resulted in the fall out of seabirds and their infrastructure is known to cause collisions of seabirds, KIUC applied for an ITP and ITL. As described in the HCP prepared in support of its application, KIUC will continue to use shielded lights, as well as reconfigure some electrical lines that are known to have high seabird collision rates. It is anticipated that these minimization measures will reduce the number of seabirds that fallout as a result of KIUC's infrastructure. To offset the remaining unavoidable impacts from lights and collisions, KIUC proposed to fund the Save Our Shearwaters program. KIUC has also proposed to conduct colony management where possible to increase the productivity of the species. The conservation measures, in conjunction with mitigation, should help to provide a benefit to the seabird species on Kaua'i. However, as KIUC does not represent all of the sources of mortality, it is likely that the population will continue to decline without significant action. To address this, DOFAW is developing the KSHCP. Companies or organizations with known fall out, or likely to result in the fall out of listed seabirds, can apply to be a member of this HCP. Mitigation funds from the long-term HCP will go toward management of nesting colonies to increase breeding success. Although the details of this HCP are not yet known, the project is anticipated to have a beneficial impact on the seabird populations on Kaua'i.

4.13.1.8 Scenic Resources

The measures that KL would undertake as part of its proposed HCP involve very small visible changes. Hence, they do not have the potential to contribute to cumulative effects in any measurable way.

The related resort and golf course development and operations that are part of the overall KL master plan would introduce new visual elements to the immediate area. However, as these new elements are similar to existing development and would not occur in areas where they would be visible to the larger community, they would not have a cumulative effect on scenic resources.

4.13.1.9 Hazardous Substances and Materials

The conservation measures that KL would undertake as part of its proposed HCP do not involve the use of hazardous materials. Hence, they do not have the potential to contribute to cumulative effects.

Construction and operation of the related resort and golf course development that are part of the overall KL master plan involve the use of small amounts of hazardous materials. All would be used in accordance with regulatory requirements, and there is a very low probability of their release into the environment. The flow paths of these materials are such that there is virtually no chance that they could combine with releases from other sources to create a cumulative hazard.

4.13.1.10 Land Use

The measures that KL would undertake as part of its proposed HCP involve the maintenance of existing natural areas rather than the introduction of new land uses. Hence, they do not have the potential to contribute to cumulative effects in any measurable way.

The resort and golf course development and operations that are part of the overall KL master plan are consistent with State and County land use plans and zoning for the area. The additional uses are in keeping with the character of existing land uses on the KL property and they are not of a type or size that are likely to have cumulative effects on land use.

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6.0 LIST OF AGENCIES, ORGANIZATIONS, AND PERSONS CONSULTED

This list includes agencies, organizations, and persons contact during preparation of the HCP and this environmental assessment.

Federal Agencies
U.S. Fish and Wildlife Service (USFWS)
Environmental Protection Agency (EPA)
National Marine Fisheries Service (NMFS)
U.S. Army Engineer Division
U.S. Geological Survey (USGS)

State Agencies
Department of Land and Natural Resources (DLNR), Division of Forestry and Wildlife (DOFAW)
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